# Rubber Journal and International Plastics

VOL. 138 NO. 26 JUNE 25 1960 Price 1s. Weekly



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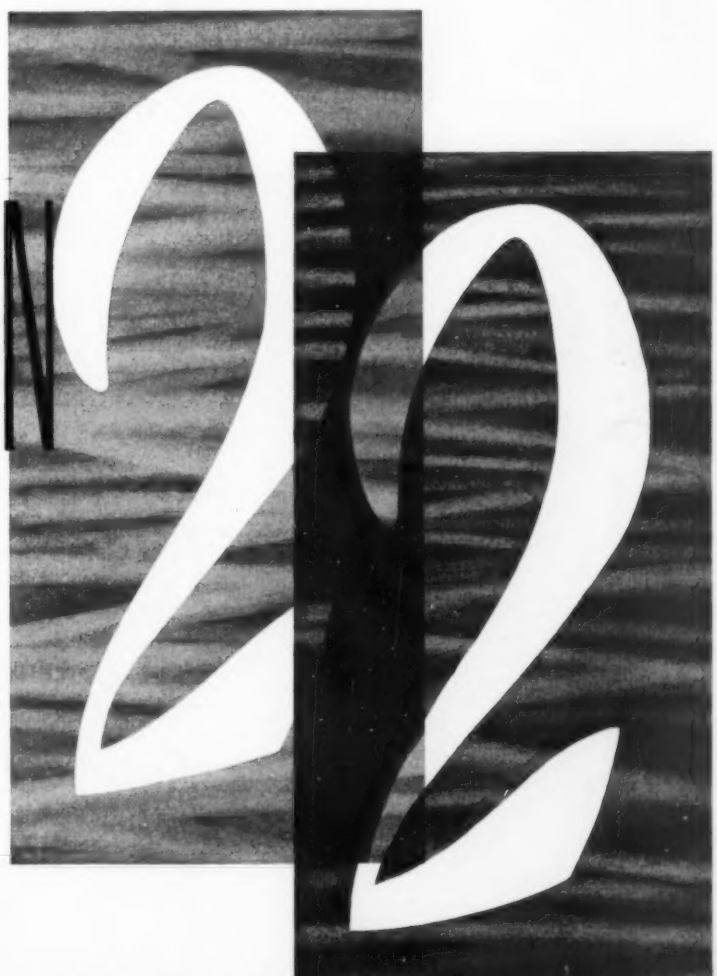

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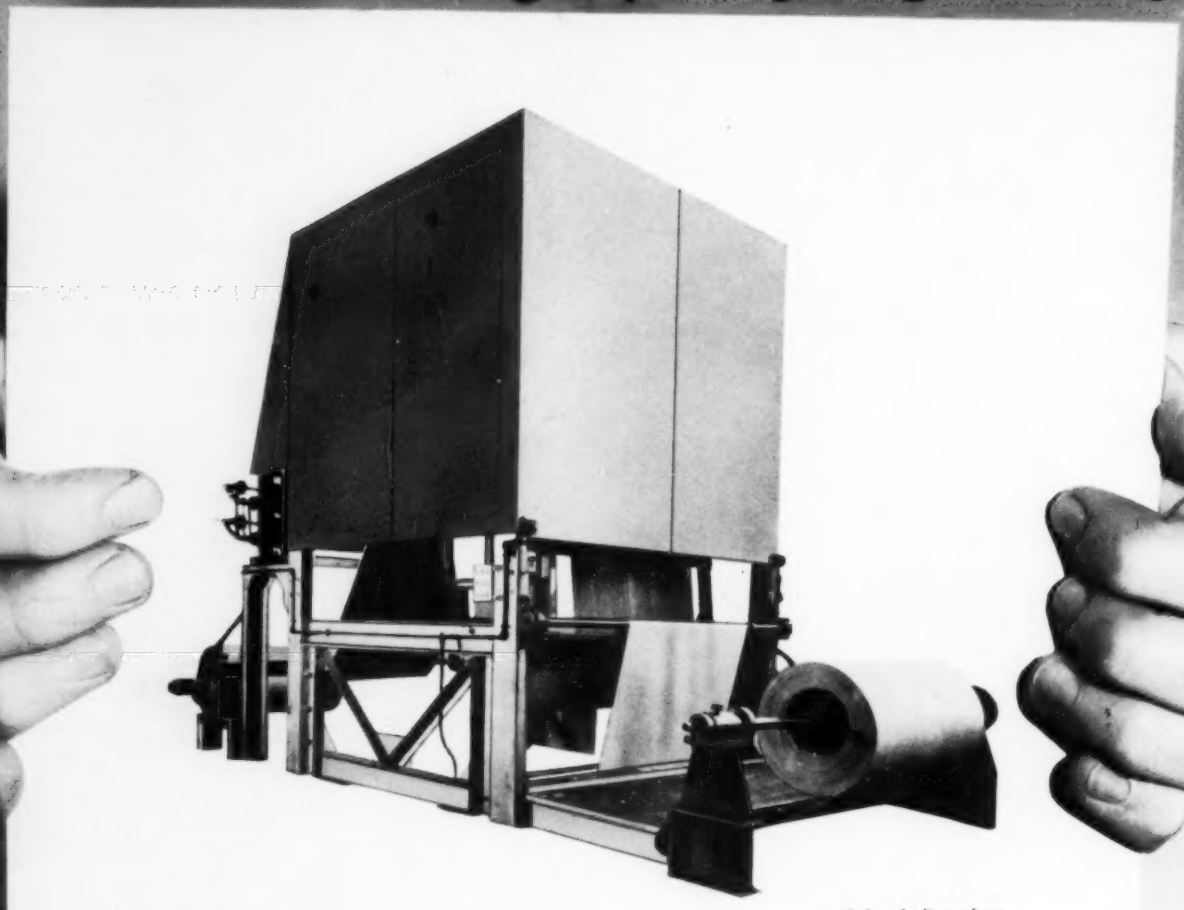

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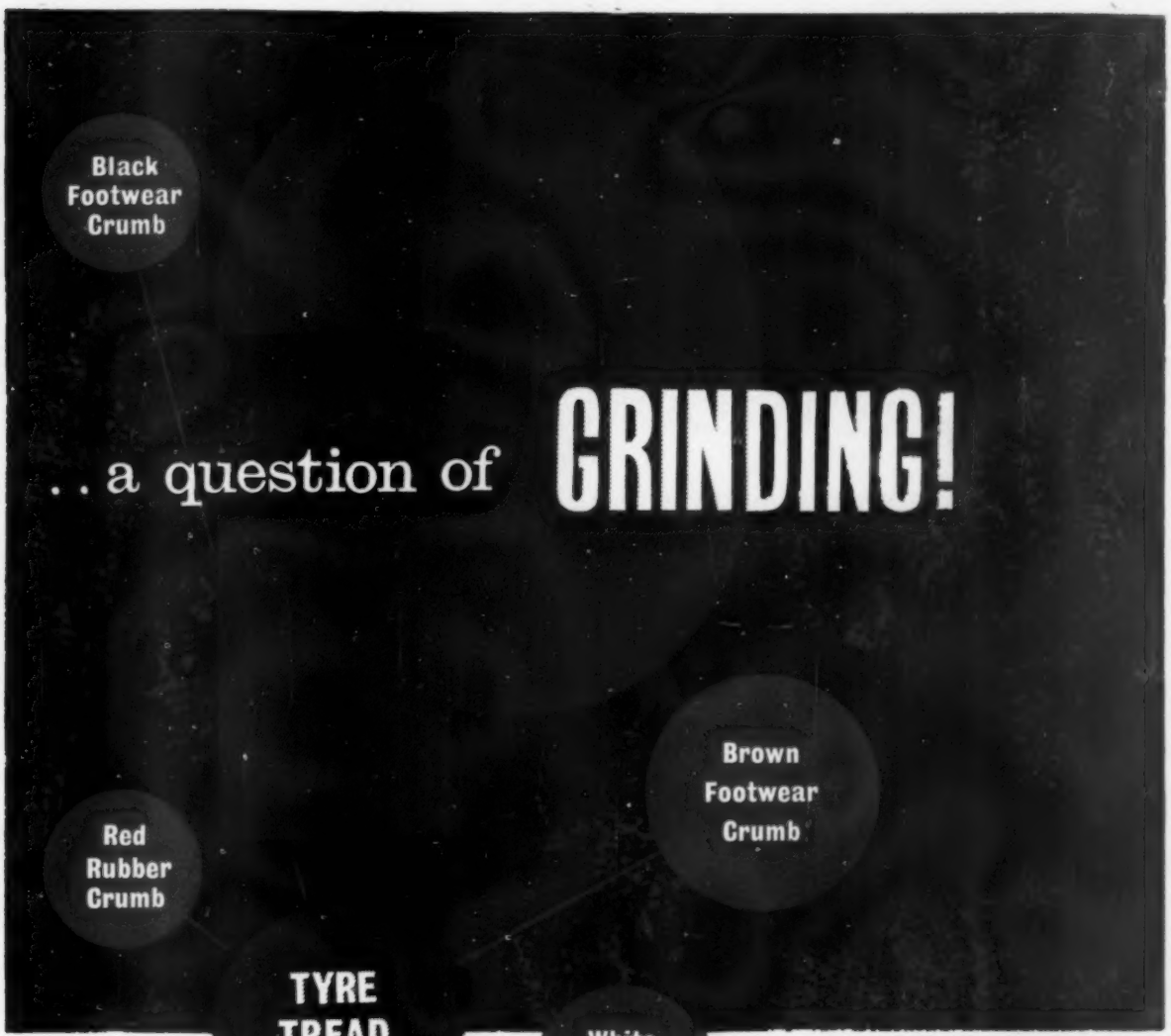


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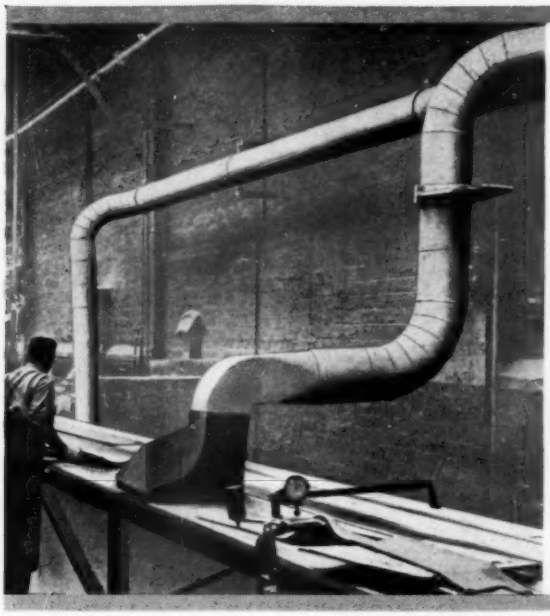

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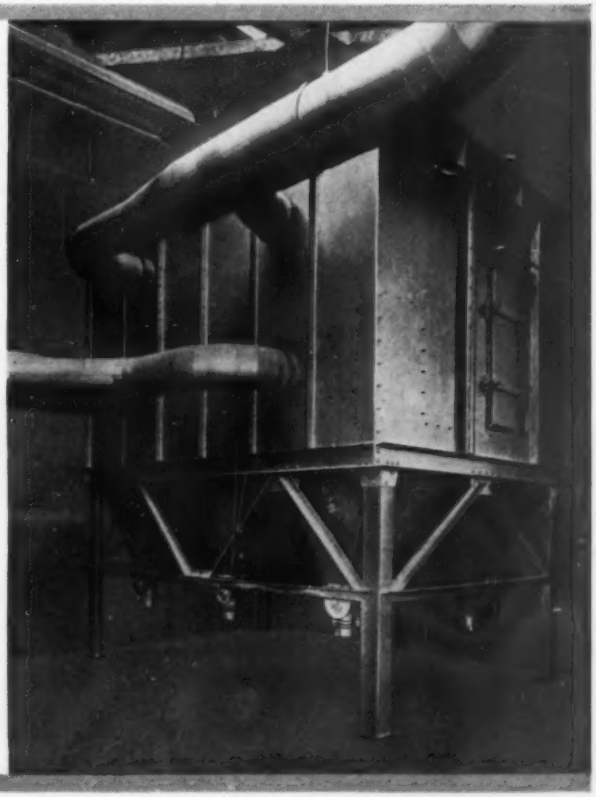

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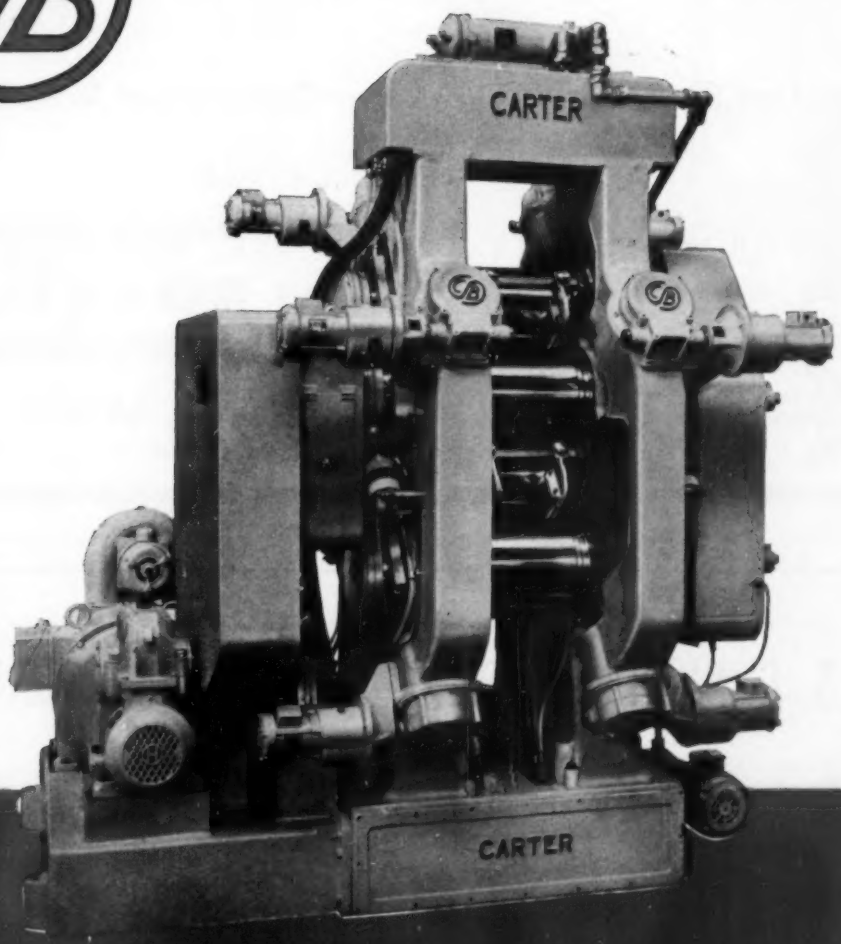


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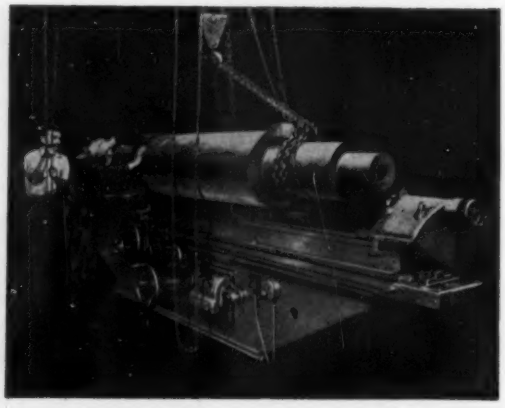

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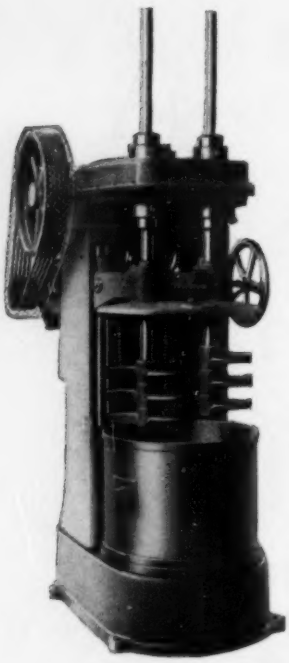

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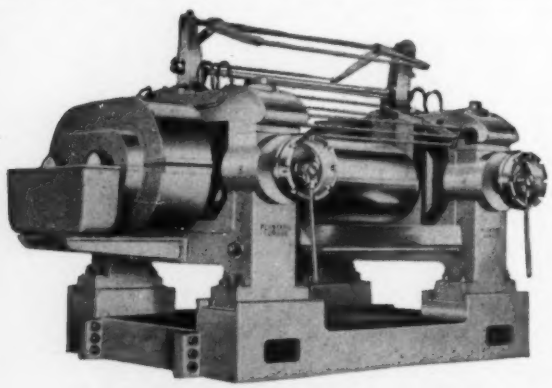

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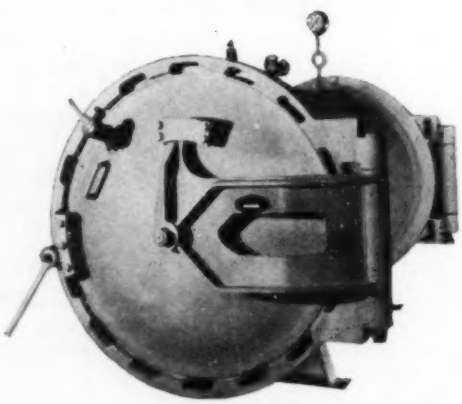

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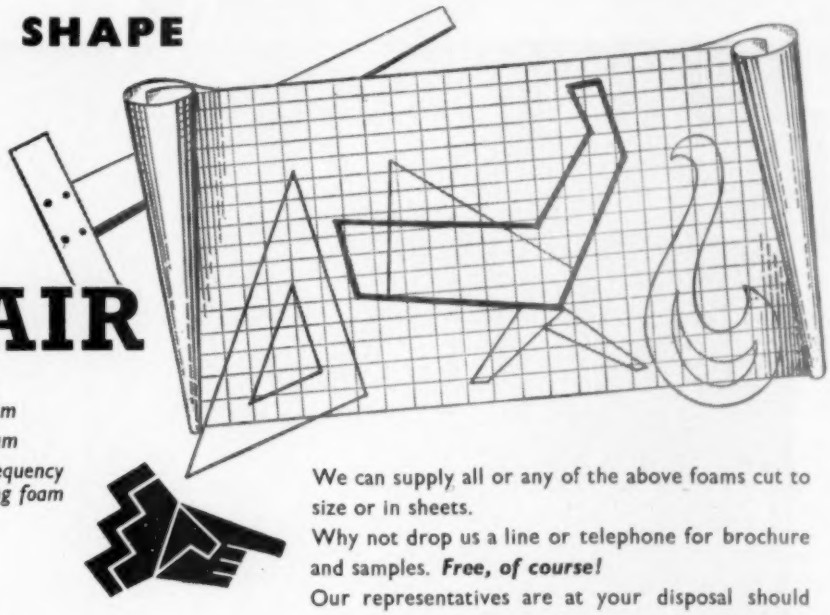

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# Rubber Journal and International Plastics

**Volume 138** **Price 1s. Post free 1s. 4d.** **No. 26**

*IN ITS 76th YEAR*

**June 25 1960**

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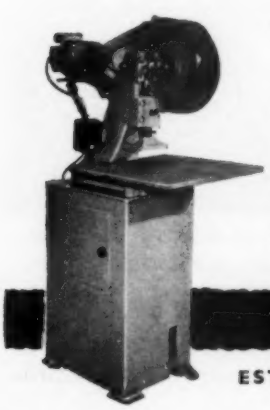

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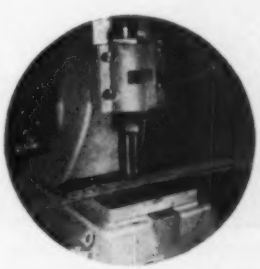

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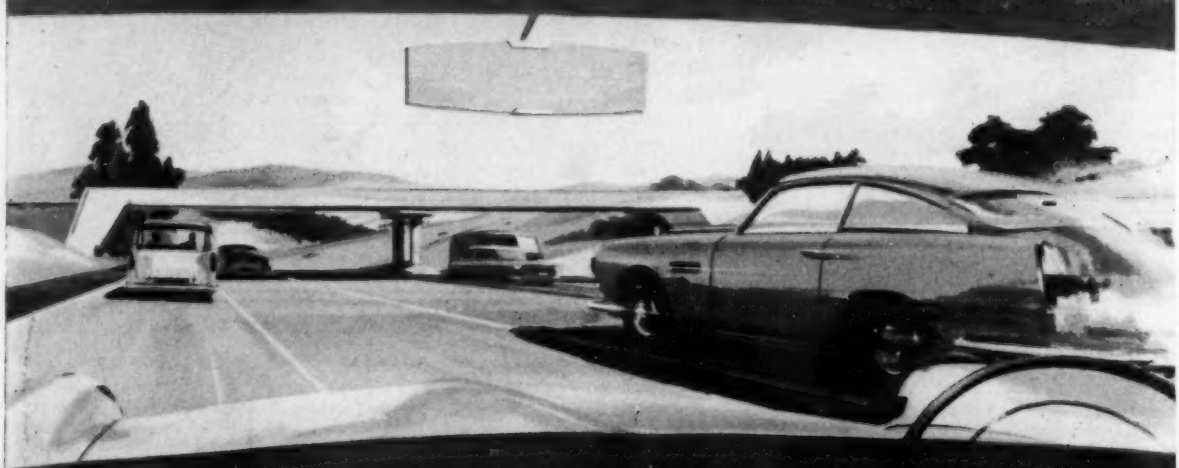

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# NOTES of the WEEK

## *On to EFTA*

ON Friday of next week, July 1, the European Free Trade Association comes into force. It is altogether uncertain, even at this stage, whether the rubber and plastics industries in this country will benefit to any appreciable extent.

Rubber industry exports individually to the seven EFTA countries, with two exceptions—Portugal and Sweden—showed an increase for 1959 over 1958, although in total a slight decrease. Figures for the first quarter of this year show that, with the exception of Austria, rubber manufactures exported to EFTA countries are running at a higher annual rate (1959, £1,880,000; first quarter 1960, £564,570) than obtained in 1958 and 1959. On the other hand, exports to EEC countries for 1959 were also higher than in 1958 and for the first quarter of 1960 are on a considerably increased scale. (To EEC 1959, £2,779,290. First quarter 1960, £967,000.)

The tariff reduction of 20% will have, at this stage, no more than a marginal influence. Taken alongside the internal reductions effected by the EEC countries last January, it will be cheaper—and cheaper still as the process progresses—for EFTA countries to buy from each other, and likewise there will be more inclination to sell in these countries. From the point of view of the UK, this is, of course, in the absence of the obvious and sensible move to go into the Common Market and take the Commonwealth too.

## *Export Potential*

EXPORTS of plastics materials to EFTA countries month by month for the first four months of this year have shown an increase over the corresponding months of 1959. But then so, and to a greater extent, have exports to EEC countries, to the Commonwealth and to 'other countries.'

Tariffs between the countries subscribing to the EFTA Convention are to be reduced in stages as from July 1, a process that will continue, also in stages, until 1970. By agreement, the ten-year period for reductions can be shortened. One of the points of difference between the EFTA agreement and that of the EEC, is that there are to be no common tariffs against non-member countries. Austria, Denmark, Norway, Portugal, Sweden, Switzerland and the UK will each maintain their own tariffs against non-members. This has raised the question of the definition of the country of origin of traded goods, which must meet certain requirements if they are to qualify for EFTA area tariff rates as between members. Excluded from these regulations (which are described in H.M. Stationery Office publication, *The European Free Trade Association* (*Origin of Goods Regulations*) 1960) are natural and synthetic rubbers, along with some other 'non-area' basic materials.

Potentially, because only a relatively small proportion comes from this country, the other six in EFTA could be a good market for UK manufacturers of plastics materials. But this is more because the potential exists—and demand is growing—than because of any advantage tariff-wise, which will be slight indeed. It is not possible to see far enough ahead to assess with any accuracy export possibilities for other sections of the industry. The Scandinavian members of EFTA seem to be the best potential markets, but the fact that during the first four months of this year the exports of plastics materials to Denmark, Norway and Sweden increased by more than 30% over the same period for 1959 may have some bearing on the matter.

It is interesting to note the comments of the economic correspondent of the *Financial Times*. Writing on 'What is Holding Back British Exports?', he states that many smaller concerns are ignorant of export opportunities and of what is happening on July 1. He urges that a commercial-type advertising campaign might more than justify the outlay involved.

## *Black Outlook for Europe*

THE opening on June 11 of the Continental-Columbian carbon black plant at Botlek, Rotterdam, marks another step forward in the healthy growth of carbon black plants in Europe. Capacity of the new plant is 12,000 tons a year. The same combination, Columbian-Continental, have set up a company in Milan and is building a plant there with a capacity of 27,000 tons annually and another at Bordeaux. The Ketjen carbon plant at Rotterdam, which went on stream in April last—a combined effort by Godfrey L. Cabot Inc. and the Royal Sulphuric Acid Works Ketjen Ltd.—has an output of 24,000 tons a year. Cabot has also created an Italian subsidiary, Cabot Italiana, which is building a 15,000 tons a year plant at Ravenna. Also at Ravenna, the Phillips Petroleum Company and ANIC are joining to build a plant with a capacity of 12,000 tons a year. This very considerable expansion, together with existing plants, is obviously aimed mainly at the Common Market countries to take advantage of the increasing trade between the members and the rising standards of living which must mean, in particular, more and more cars using more and more tyres. Even so, it seems likely that there will be some carbon black over for export from the area for some time to come.

# NEWS *Briefs*

## ADDITIONAL RUSSIAN ORDER FOR RUSTYFA
## JOHN BULL STRIKE ENDS — DU PONT RECORD
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●**United Kingdom** — An additional contract worth £1m. has been concluded with Techmashimport, of Moscow, by the Rustyfa Group of companies following negotiations with the Soviet trade delegation in Britain. Announcing this, Rustyfa said the additional contract covered anticipated requirements for spare parts for the tyre factory being erected at Dnipropetrovsk. Total orders so far received for this project amount to £16 million.

●**Bulgaria**—Co-operative farms in the Plovdiv district are growing 750 acres of early tomatoes under polythene plastic sheeting.

●**United Kingdom**—Seventy moulders at the Leicester factory of the John Bull Rubber Company, who were on unofficial strike over a pay dispute, decided to return to work on June 20 to allow talks between the union and the management to take place. One estimate is that between 600 and 700 of the firm's 1,000 employees were at one time striking in sympathy with the moulders.

●**France** — A company has been formed to carry out petrochemical activities using Sarahan oil. Called El Paso France-Afrique S.A., it is a subsidiary of the US concern El Paso Natural Gas Co., which is a big producer of butadiene and styrene. Initial capital of the new company is said to be 1m. francs (new).

●**Malaya**—Preliminary ocean shipments of rubber for May amount to 88,213 long tons.

●**United Kingdom** — Imports of rubber manufactures from the Common Market for the first quarter of this year totalled £1,337,929. Imports from members of the Free Trade area amounted to £98,839. Exports of rubber manufactures to Common Market countries for the first quarter were valued at £967,071; to the Free Trade area £564,576. These totals exclude tyres.

●**United States**—Socony Mobil Oil Company has formed Mobil Chemical Company, an operating division that will carry on broad-scaled activity in the petro-chemical industry both in the US and overseas. Mr A. L. Nickerson, the president, said the company needed a flexible organization to concentrate exclusively on the profit-making potentials in chemicals.

●**United Kingdom** — Mr P. S. Rendall, a deputy chairman and a managing director of Courtaulds, has been appointed chairman of the preparatory committee of the second world congress of man-made fibres. This will be held in London from May 8-11 1962. Mr Rendall is also chairman of both British Celanese and British Nylon Spinners, and a director of Snia Viscosa.

●**Singapore**—A Singapore Government delegation, headed by the Minister for Finance, Dr Goh Keng Swee, will leave for London on July 1 for talks with the UK Government on capital aid for the Island. Dr Goh, it is reported, will take with him his recently announced 968 million Malayan dollar blueprint for capital investment over the next five years.

●**United States**—Columbian Carbon Company, New York, has acquired the principal properties and business of Ander Chemical Company, of Cincinnati, Ohio. The transaction involved between $2,500,000 and $3,000,000 in cash.

●**Mexico**—The importation of certain goods into Mexico has been made subject to prior import licences with effect from the dates stated (B.o.T. June 17). These include rubber gloves, with or without fabric (from May 18 1960) and component parts and spare parts for motor cycles or motor scooters (from May 19 1960).

●**United States**—May sales were the highest for any month in the Du Pont Company's history, and the second quarter of 1960 volume is expected to be about equal to the record 561,586,866 dollars of a year ago, according to the chairman, Walter S. Carpenter, Jun. On the new Northern Ireland neoprene plant, he intimated that a quick expansion of capacity might be possible.

●**Canada**—Spectacular results have been claimed for a new cold-setting adhesive extracted from western hemlock bark. It has been developed by Rayonier Inc., who say that the low-cost material, a polyphenolic intermediate, can be successfully used as a partial replacement for the more expensive resorcinol.

***'As it's my first time at Wimbledon, would you and Slazengers mind if we played with my lucky balls?'—490***

# POLYURETHANE FOAMS FOR PRECIOUS PACKAGES

(By courtesy of the Victoria & Albert Museum)

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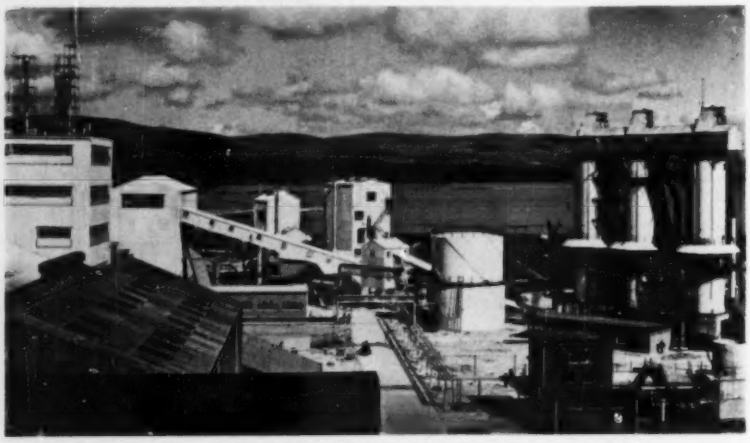
# Maydown Carbide Plant Opens

### PIPELINE TO DU PONT NEOPRENE PLANT

CARBIDE Industries' new factory at Maydown, whose main function initially will be to supply acetylene to the nearby Du Pont neoprene factory, was opened on June 15 by Lord Chandos, chairman of the Northern Ireland Development Council. The neoprene plant came on stream on May 12 (*RJIP* May 21, 760).



The new factory, which represents a capital investment of £3m. is the first acetylene and calcium carbide plant in Northern Ireland, and the supply of acetylene to Du Pont is the first bulk supply project of this gas in the UK.

The plant will begin by producing 50,000 tons of carbide, the bulk of which will be converted to acetylene, compressed and pumped, via pipeline, to the Du Pont plant. The carbide furnace has been supplied by Electroemisk A/S of Oslo and the factory was designed and built by British Oxygen Engineering—both these companies, like Carbide Industries itself, are members of the British Oxygen group.

300 people will be employed by the plant, which occupies a 60-acre site, of which 35 acres are still available for any necessary further expansion. Other main outlets for acetylene include vinyl chloride, trichloroethylene and acrylonitrile.

## Tyre of Tomorrow

Goodyear of Akron has initiated an intensive research and testing programme with five synthetic fibres in an effort to produce what they call a 'tyre of tomorrow.' This is expected to perform and wear far beyond present levels, according to Dr R. P. Dinsmore, the Goodyear Company's vice-president in charge of research and development.

The new fibres fall into three general classifications — polyester, polyvinyl and polyamide. The polyester group Goodyear is studying comprises Vyrcon, Terylene and Dacron. The polyvinyl fibre is vinal. HT-1 with nylon constitutes the polyamide group.

## PETROCHEMICAL PROJECTS IN MEXICO

BY 1962 Mexico will have 28 petrochemical plants, according to Señor Gutiérrez Roldán, director of Petroleos Mexicanos. Half of these are said to be already under construction.

The petrochemical industry, he said, would be separated from Pemex and run directly under the State. But private enterprise would be responsible for three plants, including one for synthetic rubber.

Of the 28 plants, three will be for the production of synthetic rubber and two for plastics. Six will produce benzene aromatics, four ammonia and derivatives, seven lead tetraethyl and the rest miscellaneous products including sulphur.

## Four-mile Pipe

Nearly four miles of PVC pipe is being used in the Grants, New Mexico, uranium concentrating plant of Kermac Nuclear Fuels Corp. to carry corrosive mixtures of acid and organic mixtures that would soon impair the usefulness of metal pipe. The pipe was made by B. F. Goodrich Industrial Products Co.

Corrosive mixtures pass through it 24 hours a day at a rate of up to 2,400 gallons a minute, reach a temperature of 110°F. and pressures up to 50lb. psi.

## June 11 at 10.12 a.m.

The new Continental - Columbian carbon black plant at Botlek, near Rotterdam, came on stream at 10.12 a.m. on June 11.

The plant, which represents a capital investment of 13m. guilders, is a joint venture between Continental Carbon and Columbian Carbon. The two firms have a further two plants under construction in Europe—one in Milan and the other in Bordeaux. They are expected to be completed by the end of this year.

The Botlek plant will produce, it is estimated, 24m. lb. (11m. kg.) of carbon black a year, of which 70% will be exported.

## European Outlook

'Industrial Europe looms as a very important factor in world economy,' said Harvey S. Firestone, Jun., chairman of the Firestone Tyre and Rubber Co.

He was speaking in New York, after arriving in the Queen Elizabeth from his European tour, which included officiating at opening ceremonies of new Firestone plants in France and at Alcochete, Portugal.

Mr Firestone indicated that industrial production was increasing at a greater rate in Western Europe than in the USA. The outlook for business was excellent particularly for the rubber industry.

A big part of the industry was geared up with the car industry: as the latter expanded so did the former.

'A second industrial revolution,' commented Mr Firestone, 'which has been in process in USA for many years is now in full stride in Western Europe.'

## Peak Plastics Sales

Net sales of plastics materials reached a new high level in the first quarter of 1960 at 146,400 tons. This is 29% higher than the 1959 figure.

Thermoplastics continued to expand at the greatest rate: total sales in this group were 33⅓% up at 92,000 tons.

Thermosetting materials also did well: sales were 22% up at 55,000 tons.

Full figures are given on page 984.

# £4m. for Rubber Suspended Silver Trains

London Transport announce that they have placed another big order for new Underground trains to improve rush-hour travel. They are to buy 27 more 'silver' trains at a cost of about £4m., for the complete replacement of existing rolling stock on the Uxbridge service of the Metropolitan Line. Each of the 216 new cars, which will make up the trains, will be suspended on rubber for smooth running. Rubber will be used for the bogie bolster and the axlebox suspension.

Rubber suspended 'silver' trains have been in use on the Piccadilly Line since December 14 1959, and the contract for these suspension units on this line was carried out by Metalastik Ltd. The four-wheel bogie suspension is of an entirely new design, using rubber in compression and shear instead of conventional steel springs. The bogie bolster, normally mounted on coil springs, is supported at each end by two cylindrical rubber packs in the form of an inverted 'V' and inclined laterally to cater for all forces acting on the bolster.

Warerite will be used for the wall sheeting of these new cars.

The contract is being carried out by Cravens Ltd. of Sheffield, who are already dealing with a £4m. order for the Amersham branch of the Metropolitan Line.

## FRENCH INVESTMENT IN AUSTRALIA

The International Finance Corporation (IFC) announced on June 16 that it is to invest $90,000 in Rubbertex (Australia) Pty. Ltd., to help finance increased manufacturing capacity and a new product line. Additional financing for the expansion will be provided by the publicly-owned parent company, Rubbertex Industries Ltd., from the sale to its shareholders of a A£75,000 issue of notes maturing in ten years with options attached.

This will be IFC's second investment in the company. The first, made in 1959, totalled $225,000.

Rubbertex manufactures a wide variety of products involving the processing of rubber and rubber-like synthetics, and the bonding of some of them to metal. The products are widely used by manufacturers of appliances, automobiles, tractors, and aircraft.

# New Process for Phenol

### SUITABLE FOR SMALLER PACKAGE PLANT INSTALLATION

A NEW process for the manufacture of phenol has been announced in America by the Scientific Design Company Inc. The new process is said to make possible the direct oxidation of benzene to phenol.

The announcement was made by Dr Ralph Landau, executive vice-president of Scientific Design at the International Congress of Chemical Engineering held in Mexico City. This congress is a joint meeting of Instituto Mexicano de Ingenieros Quimicos and the American Institute of Chemical Engineers.

'The new SD phenol process has been the result of a deliberate research effort to find a new process which featured low capital investment and absence of by-products for sale—one of which would therefore be particularly suitable to smaller package plant installation,' said Dr Landau. He added that it was too early to speak of specific plants but 'these will not be long in coming.'

In his paper, 'Package Plants for the Latin American Petrochemical Industry,' Dr Landau discussed the package plant concept of acquiring at one time process, engineering, design and construction of a chemical plant as a basic method for initiating a successful and competitive petrochemical industry in Latin America. This concept permits the installation of small plants that can produce economically and compete with any large plant operating in any country, which is of great importance to Latin America where domestic markets for petrochemicals are beginning to grow.

## London Sumatra Successful

London Sumatra Plantations has been successful in its bid to acquire control of seven Sumatra plantation companies (*RJIP* May 28, 829).

Acceptances have been received as follows: United Serdang (Sumatra) 73%; Allied Sumatra Plantations 75%; Lankat Rubber 77%; Mendaris (Sumatra) Rubber and Produce 82%; Soengi Rampah Rubber and Coconut Plantations 66%; Tandjong Rubber 76%; Toerangie (Sumatra) Rubber and Produce 89%.

The directors have declared all the offers unconditional, following upon an increase of London Sumatra's authorized capital to £1,100,000.

## DUNLOP OFFER FOR PREFS.

Dunlop, which already owns the ordinary capital of the John Bull Rubber Company and Slazengers, is making offers for their preference shares.

The offers are based on the exchange of shares; for each £1 John Bull 5½% preference share (of which there are 90,000) one 5½% Dunlop preference share of £1; for every four £1 Slazenger 6% (tax free up to 6s.) preference shares (of which there are 100,000) seven Dunlop preference shares; and for every eleven £1 Slazenger 4½% preference shares (of which there are 300,000) nine Dunlop preference shares.

These offers if accepted will involve the issue of 510,454 additional preference shares by Dunlop and will enable the preference shareholders of John Bull and Slazengers to obtain the advantages of a wider market.

**Du Pont's elastomers research laboratory at Hemel Hempstead is now a year old. One of the instruments in constant use is this Xenotest Weatherometer, which subjects specimens to artificial weathering. The laboratory provides technical assistance for rubber manufacturers and processors in Europe, Africa, Australasia and parts of Asia. Most commercial processes can be accurately duplicated**

# Stabilizers for PVC Compounds*

By H. VERITY SMITH,
Meister A.G., Basle

THEORETICALLY, pure linear PVC should be thermally stable. 1,3,5-trichlorhexane is stable at 300°C. for long periods and shows no tendency to evolve hydrogen chloride. In practice, however, commercial PVC is not pure, is not linear and therefore is not thermally stable. It is necessary to add stabilizers which inhibit the tendency to thermal degradation, reduce the rate of thermal degradation, and minimize its effects. The structures produced by thermal degradation are unsaturated and, in the presence of air, prone to further degradation considerably accelerated by ultra-violet light.

An efficient heat stabilizer will normally confer good light stability by inhibiting the formation during processing of these unstable unsaturated structures. Additional stabilizing agents specifically designed to combat the effects of ultra-violet radiation may be added, but are unlikely to be effective in the presence of a substantial degree of unsaturation. The factors affecting the choice of stabilizers are many and various, and the choice of stabilizer is nearly always a compromise between a number of conflicting considerations. The most important factors from the point of view of the compounder are as follows:

### Degree of Plasticization

The greater the concentration of plasticizer, the lower the processing temperature, the longer the period of inhibition before decomposition begins, and the slower the rate of decomposition. In practice separate stabilizer systems for unplasticized and plasticized stocks are customary. The type of plasticizer used influences the choice of stabilizer. Taking the phthalates as the norm, the sebacates effect a slight, and the epoxys a considerable improvement in stability, while the phosphates and chlorinated extenders reduce it; the phosphates tend to darken on heating, and the chlorinated extenders tend to dehydrochlorinate in a manner similar to that of PVC.

### Temperature of Processing

At any given degree of plasticization, the processing temperature is dependent upon the type of process employed, and upon the design of the machinery used. For example, a compound which would process satisfactorily at 170°C. on a slow calender, might be subjected to a temperature over 200°C. on a modern high-speed machine. The great increase in calendering speeds in the last few years has revolutionized the stabilization of calendering compounds.

A further factor in high-speed calendering is the phenomenon of plate-out, which was rarely encountered on slow machines, but prevents the use of soap stabilizers on high-speed machines. This is largely a temperature effect.

The increase in the rate of spreading of textile coatings has resulted in the introduction of much higher curing temperatures which are exceedingly difficult to measure. The increasing use of rotational casting has also brought about severe stabilization problems in the plastisol field, coupled again with difficulties of measurement.

### Processing Time

The old-fashioned method of calendering using a cold mixer followed by an internal mixer of the Banbury type, followed by a chain of open roll mills and a calender operating in the speed range of 10-30 metres per minute, meant that the compound was frequently held at temperatures in the region of 160°C. for as long as 35 minutes.

In modern practice, using a dry blend polymer on a high-speed mixer, followed by rapid gellation and calendering at 60-100 metres per minute, the compound may reach a temperature of 220°C., but will be above 160° only for 5 or 10 minutes.

The older soap stabilizers with good performance at moderate temperatures over a long period were ideally suited to the older method. The new process demands the non-soap stabilizers with their excellent high temperature short-term performance.

### Reprocessing of Scrap

In assessing the time for which the compound is to be subjected to a high temperature, it is essential to consider the cumulative effect of the reworking of scrap and process rejects. While in calendering, once steady conditions have been achieved, the rate of reprocessing of trim should be constant, an integrated plant may well have to reprocess the off-cuts from garment manufacture, etc. Injection moulding operations, particularly with multi-impression moulds for small components, may have a very high proportion of scrap in the form of reground sprues and runners, to contend with. These factors must be taken into account when designing laboratory tests intended to guide the choice of stabilizer system.

### Other Compounding Ingredients

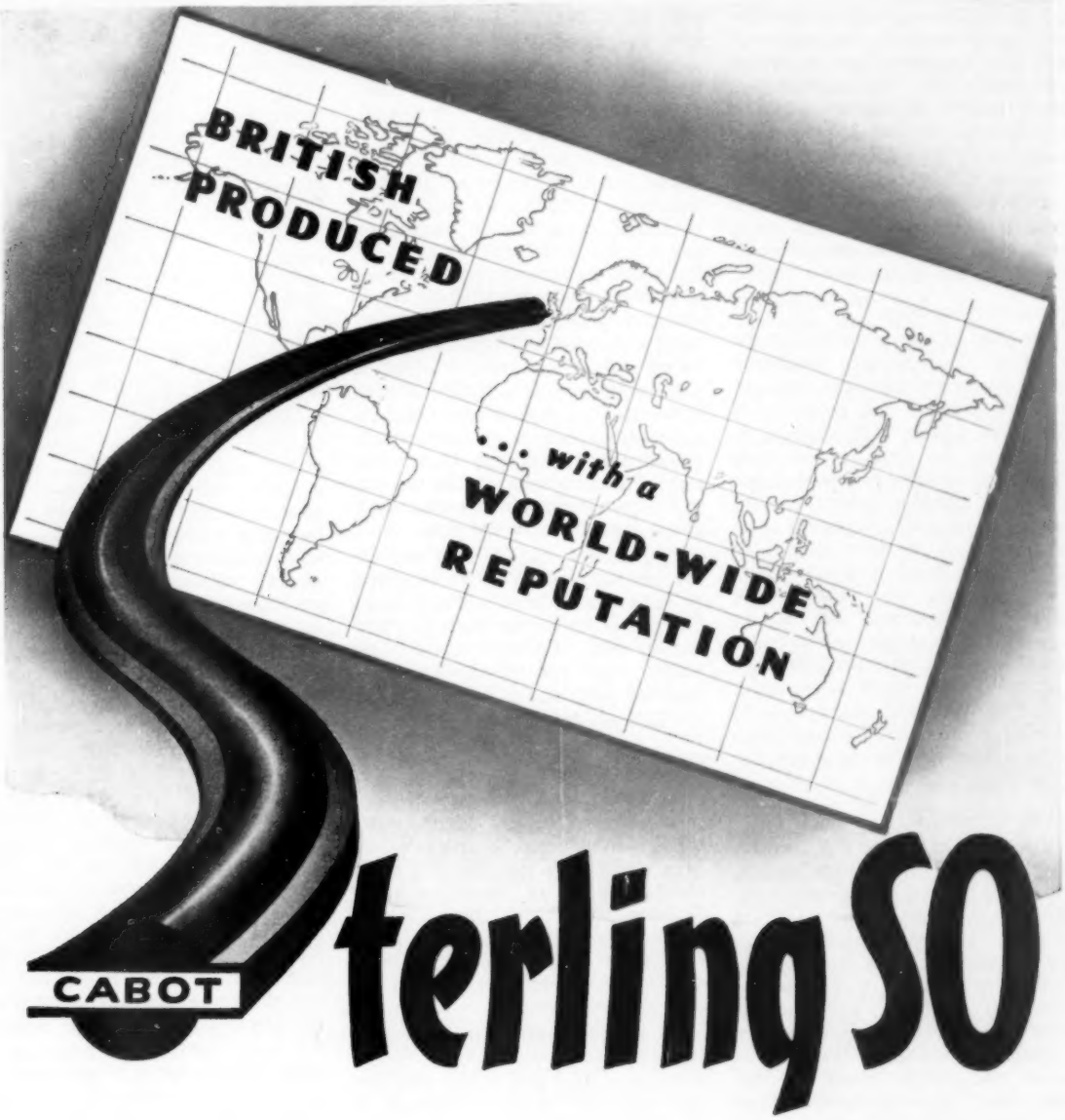
The most significant of these are the fillers, some of which present stabilization problems. In the case of asbestos in heavily filled floor tiles, it is more important to inhibit the effect of iron in the asbestos than it is to provide conventional stabilization for the PVC. In the United States, it is common practice to incorporate in acetate - copolymer, asbestos-filled floor tile, so-called stabilizers which inhibit the effect of the iron in the asbestos on the rate of the decomposition of the PVC but which do not in themselves stabilize PVC at all. This is a practical proposition when process temperatures are below 125°C.

We have been considering those factors in stabilizer selection which are determined by the technology of compounding and processing. Equally important, and frequently the deciding factor, is the end use of the vinyl product.

### Colour Stability

In many industrial applications, particularly in the rigid PVC field, the colour of the compound is comparatively unimportant, and many industrial products have a colour which would be quite unacceptable in consumer goods. This colour frequently is due to partial decomposition of the PVC to an extent which is too small to have any major effect on the mechanical or chemical properties of the product, but which is large enough to limit the range of colours available. Such products may frequently be processed with the aid of cheap and comparatively inefficient stabilizers, which nevertheless give an adequate performance in the

*(*Paper presented at the Norwegian International Plastics Congress, Oslo — May* 24 1960)

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finished products. In the production of consumer goods, on the other hand, it is invariably necessary to provide a degree of stability which will enable the manufacturer to comply with the increasingly stringent requirements of colour reproducability set by his customers. In this connexion must also be mentioned such obvious limitations on stabilizer choice as the impossibility of using the opaque basic lead stabilizers in transparent and translucent articles.

**Weathering Stability**

The most severe requirements are in thin, transparent, plasticized articles for continuous use in the open air. The thinner the product the greater the surface area exposed in relation to the mass of material. Transparent articles are much more difficult to stabilize against sunlight, because in opaque compounds, pigments such as titanium dioxide or carbon black being opaque to ultraviolet radiation, offer considerable protection. Plasticized articles are more difficult to stabilize against sunlight than are unplasticized, because some plasticizers break down under severe exposure and there is some evidence to show that the breakdown products accelerate the decomposition of the PVC.

**Service Conditions**

Many applications of PVC involve the use of stabilizers which are unaffected by substances with which the vinyl article is to be in contact in service. For example, modern furniture construction methods frequently involve the use of a PVC-coated fabric on a foam rubber base. Stabilizers for this product must be non-sulphur staining, as otherwise the rubber vulcanizing system will discolour the PVC very rapidly. Floor tiles containing a lead stabilizer will discolour in contact with rubber shoe soles, rubber feet on furniture, rubber tyres on cars in motor showrooms and on trolleys in hospitals, permanent waving solution in hairdressing saloons, and the sulphurous atmosphere of industrial cities.

Certain types of stabilizer cause trouble in contact with the copper moulds used for rotational casting.

Great care must be taken in the stabilization of PVC compounds containing iron oxide pigments, and in this connexion the use of the inhibitors originally developed to minimize the effect of iron in asbestos used in floor tiles, have been found advantageous.

**Toxicity**

At present the prime consideration in the selection of a stabilizer for a product to be used in conjunction with foodstuffs, or water, is not the toxicology of the stabilizer itself, but the particular regulations in the country in which the product is to be sold. These vary from a total ban on all derivatives of certain metals, including metals which are freely permitted in other countries, to a situation where there are no regulations whatsoever, and it is left to the individual manufacturer to decide what is likely or not to poison his customers. There seems to be a possibility that the International Standards Organization will be able to introduce some degree of uniformity into this confusion, at least as far as water pipe is concerned. It is likely that the new specification will be based on the content of the water extract from the pipe, rather than on any hypotheses about the toxicology of the ingredients of the pipe.

In general it may be said that the calcium zinc stabilizers are approved by the United States Food and Drugs Administration for the packaging and transport of non-fatty foods. The handling of fatty foods is not a stabilizer problem, as the major factor is plasticizer extraction.

**Economic Factors**

In many cases, compounders and processors of PVC feel that the overriding consideration in the selection of a stabilizer is its cost. This is almost always an erroneous view. Although the stabilizer may easily be the most expensive component of the formulation per kilo, it is very unlikely that it will be more than 5% of the cost of the compound.

In extrusion and injection moulding operations, however, the difference between a good and a bad stabilizer can very easily make a difference of 10 or even 15% in the rate of production by reducing the number of times during the week in which it is found necessary to clean out the machine to remove decomposed material. Cleaning out is an important source of lost production time, but it is frequently regarded as an unavoidable feature of the process. In fact, if you cannot run a rigid tube extrusion non-stop for a week, it may be said that you need a better stabilizer. In calendering, one finds cases where the machine is not operating at its full speed often because a cheap stabilizer system fails at the higher temperatures involved in high-speed running, allowing discoloration, or begins to plate out due to incompatibility at the higher temperature. If the operator is only measuring roll face temperature, he may not even be aware of the enormous rise in temperature in the stock caused by the increased rate of shear of the PVC in the rolling banks at high speeds. A change in the stabilizer system will, under these conditions, pay for itself in increased output from the large investment represented by a modern high-speed calender.

In general, it can be stated with confidence that the traditional stabilizers, such as lead stearate, lead carbonate, cadmium stearate and so forth, are losing their market to the newer and more highly-developed materials, chiefly because of the insistence of the consumer on a more durable and serviceable article, the increasing processing temperatures involved in modern high-speed plant, and the increasing consciousness of the need for maximum productivity. While the foregoing considerations, concerned with processing and end-use, frequently determine the type of stabilizer, the most significant deciding factor in the selection of the stabilizer formulation is the brand of PVC resin used.

The difference in stabilization requirements of different brands of vinyl polymers is to a large extent the difference between the impurities they contain. These impurities are residual catalyst, suspending agent, emulsifying agent, chain stoppers, so-called 'pre-stabilizers' and various other contaminants, deliberately or inadvertently contained in the commercial product. It has long been known that certain stabilizers are ineffective when used on certain resins, and that the effectiveness of any stabilizer is considerably affected by the resin on which it is used. It is common knowledge that an amine system such as a mixture of diphenyl urea and 2-phenyl indole is highly effective on some of the soda-containing German-type 'Mersolate-emulsified' resins. It does not, however, appear to be quite so widely known that this amine system is not effective on polymers manufactured by some other emulsion systems, whereas stabilizer systems suitable in the main for suspension polymers, will frequently work on those emulsion polymers for which the amines are ineffective.

The principal types of vinyl stabilizer currently in general use are as follows:

**Lead**

The lead stabilizers still stabilize about 50% of the total quantity of PVC which is used in Europe. With a few notable exceptions, the principal advantage of the lead stabilizers is their low weight cost. The term

'weight cost' is used advisedly, as the volume cost of most of the lead stabilizers is little below that of the cheaper barium-zinc and barium-cadmium types. The exceptions to the general principle that lead stabilizers are selected for economic rather than technical reasons, are in the electric cable field where lead is almost universally used because of the excellent electrical properties which can be obtained.

Dibasic lead phosphite is also frequently used for other than economic reasons. Its outstanding light stability makes it highly acceptable for use in opaque compounds destined for outdoor exposure in cases where sulphur-staining is not of prime importance.

**Amines**

While the lead stabilizers are still the largest group in terms of tonnage used, they are not the oldest stabilizers. Historically, the earliest stabilizers were the amines, particularly diphenyl urea, 2-phenyl indole, monophenyl urea, diphenyl thiourea and similar compounds. These have been used in Germany since the beginning of the PVC industry, and on the soda-containing emulsion polymers, the manufacture of which in Germany commenced in the late 1930s, these stabilizers are extremely effective and unlikely to be replaced. Their great defect is that they do not confer good light stability, but combinations of barium and cadmium, with certain selected amino compounds can give excellent light and heat stability on this type of polymer.

**Barium-cadmium Systems**

The most consistent line of development in post-war years has occurred in the field of barium-cadmium stabilization. Originally mixtures of barium and cadmium soaps were found to give much better results than either type of soap used separately. It was then found that a great improvement in performance was obtained by coprecipitating the two metals together. This resulted in the well-known barium-cadmium-laurate stabilizers like Advance B.C.12, and Ferro 1820. This type of product is still used in large quantities and is still very good value for money. One of its drawbacks in the calendering field, however, was its adverse effect on print adhesion and weld strength due to slight over-lubrication. This tendency was overcome by the introduction of the very well-known and successful three-package system of barium-cadmium soap, epoxy resin and organic phosphite—the usually misnamed chelating agent. The effect of the epoxy was to reduce the amount of soap required to provide adequate stability, thus overcoming the weld strength and print adhesion difficulties, while the use of the organic phosphites greatly improved clarity and still further improved heat stability.

All was well with this system for some time, and in fact it is still highly satisfactory for extrusion and moulding compounds. The high-speed calender, however, causes almost all soaps to plate out on the calender rolls, and the solid barium-cadmium stabilizer is being forced out of the calendering trade by the liquid barium-cadmium compounds.

Originally, these compounds were based on obscure branched chain alkoxy fatty acids which were difficult and expensive to manufacture, but which gave very good results. The newer ones are mostly based on the metal derivatives of alkyl phenols. These give excellent short-term high-temperature performance, and brilliant clarity, but are almost impossible to make into good one-package systems, and are deficient in long-term stability. On certain types of suspension polymer, they are generally used in conjunction with a minor amount of a liquid zinc stabilizer to improve the early colour, but this practice can easily be overdone.

There are signs that the present liquid barium-cadmium stabilizers will be superseded by one-package systems incorporating new types of so-called chelator and using different methods of obtaining a soluble barium and cadmium compound.

**Barium-zinc**

The use of epoxy and chelating agent in combination with liquid or solid barium-cadmium stabilizers greatly reduces the tendency of the cadmium to form yellow sulphide stains, and in some cases can completely eliminate it, and while the use of a zinc addition further reduces the sulphur-stain potential on some polymers, there is still a demand for stabilizers having absolutely no possibility of sulphur staining. To meet this demand, the barium-zinc stabilizers have been developed, some liquid, some solid.

These are used for two principal applications, in Europe for flooring and in America for flooring and textile coating. They are now being introduced into Europe for textile coating, and should have considerable success on the more modern types of paste polymer. Barium-zinc stabilizers are much less efficient than, and cannot stand as much reprocessing as, barium-cadmium stabilizers. On the other hand, zinc is a very much cheaper material than cadmium, zinc oxide being about one-twentieth the price of cadmium oxide. Consequently, on economic grounds, the barium-zinc stabilizer is frequently of advantage, despite its lower efficiency per kilo compared with the barium-cadmium compound.

**The Organotins**

The most expensive range of stabilizers, and now the most controversial, are the organotins. The manufacture of organotin stabilizers in Europe is still increasing. This is largely because the technology of vinyl processing is not standing still. New applications are being developed which require greater thermal stability, new machines are coming into use with much faster output, and consequently much higher processing temperatures. If the greatest possible degree of heat stability is required, organotins are still the answer. The heyday of the simple organotin stabilizers such as dibutyltin dilaurate and dibutyltin maleate is undoubtedly drawing to a close, but the sulphur-containing organotins, the mercaptides, thioglycolates and their relations, are still being used in increasing quantities. Newer and better types are making their appearance, newer and better methods of handling them are being developed. The odour problem is being overcome. The stabilizers are being offered in forms which are more easy to incorporate in the PVC compound and there is little doubt that in a rapidly-expanding PVC market, there is a considerable future for these products.

Current European practice may be summarized as follows:

*Calendered film and sheet* — For slow calenders and plants involving a long heat history — barium-cadmium soaps with chelating agents and phosphites. For fast calenders—liquid barium-cadmium systems with or without zinc, epoxy and other additives. Care must be taken to suit the stabilizer system to the resin.

*Non-toxic sheet* — calcium zinc epoxy systems.

*Calendered foil and rigid sheet*— For transparent compounds—organotins. For non-toxic compounds—a new type of calcium-amine stabilizer. For general-purpose rigid foil and sheet—barium-cadmium compounds with organic synergists.

*Plasticized extrusions* — General purpose — barium-cadmium soaps with chelating agent and epoxy. Crystal clear—organotins or liquid

barium-cadmium systems. Non-toxics —calcium-zinc epoxy systems.

*Unplasticized extrusions*—General purpose—lead-barium-cadmium systems. Non-toxics—a new type of calcium-amine stabilizer. Transparent compounds—organotins.

*Cables*—lead-barium-cadmium systems.

*Plastisols*—the stabilization of individual plastisol resins varies so widely with the nature of the resin that it is best to develop individual stabilizers for each resin which have very widely varying compositions.

*Flooring compounds*—barium-zinc systems with organic additives which vary with the type of filler employed.

*Injection moulding compounds*—Plasticized general purpose—barium-cadmium soaps with epoxy and chelating agents. Plasticized transparent compounds—organotins. Unplasticized compounds — organotins. The most promising lines of development are in the field of liquid barium-cadmium compounds with a variety of additives. The organotin sulphur compounds will probably increase in importance over the next few years whereas the lead compounds are likely to decline to a considerable extent.

## Laboratory Equipment Exhibition

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# A New Angle on Dexion

### SEARCH FOR NEW APPLICATIONS OF GRP

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**Glass reinforced plastics extraction hood made by Dexion and installed in their new Hemel Hempstead plant**

A spokesman said that a number of novel applications of GRP were being considered by the company's research and development department. One or two products, such as extraction hoods for industrial and domestic use and a new type of rooflight are in pilot production.

From Dexion's past record, it seems likely that any suitable application will be rapidly developed. Five acres of the eight-acre site at Hemel Hempstead have been developed, and the company has the option on a further eight acres.

In twelve years Dexion have developed from three men and no sales to a world-wide organization employing over 1,000 and having a turnover of £6m. The company has manufacturing subsidiaries or associates in Belgium, Australia, Canada and Greece, sales companies in Germany, Austria and the USA and licensees in seven other countries.

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Grey-green PVC leathercloth has been used to cover the panelling of the walls of the auditorium of London's new Royalty Theatre, which had its opening night last Thursday.

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THE Councils of the Institution of the Rubber Industry and the Plastics Institute have set up a Liaison Committee consisting of five representatives of each body to consider and report back on the advantages and disadvantages of closer co-operation and the practicability of amalgamation. The Committee will report to the two Councils later this year.

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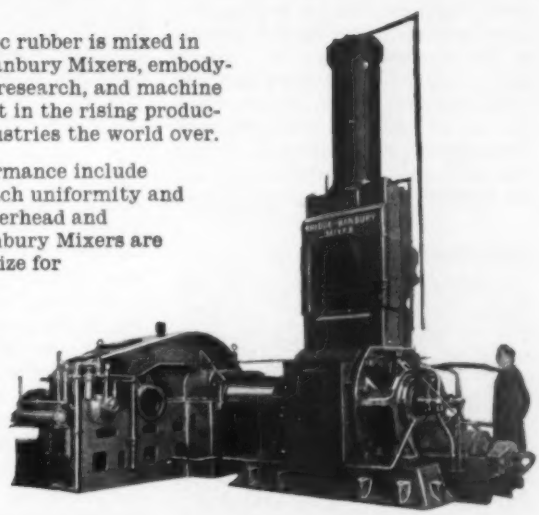
No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

Indisputable claims for Bridge Banbury Mixer performance include optimum dispersion, speedier mixing, consistent batch uniformity and quality, increased production and a lower labour, overhead and maintenance cost per unit of production. Bridge Banbury Mixers are designed for round-the-clock operation. There is a size for every production requirement. Ancillary machinery matched to deal with the increased output and further streamline the production flow is available. **Bridge-Banbury Automation is continuous production.**



Fully detailed technical information is freely available on request.

* *Banbury is a registered trade mark in many countries throughout the world.*

# * BRIDGE - BANBURY MIXERS *

*. . . . ACCLAIMED AS THE ULTIMATE IN MIXER EFFICIENCY*

BRIDGE

**DAVID BRIDGE & CO. LTD. CASTLETON, ROCHDALE, LANCASHIRE.**

*In technical association with Farrel-Birmingham Co. Inc. Ansonia, Conn. U.S.A.*

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barium-cadmium systems. Non-toxics —calcium-zinc epoxy systems.

*Unplasticized extrusions*—General purpose—lead-barium-cadmium systems. Non-toxics—a new type of calcium-amine stabilizer. Transparent compounds—organotins.

*Cables*—lead-barium-cadmium systems.

*Plastisols*—the stabilization of individual plastisol resins varies so widely with the nature of the resin that it is best to develop individual stabilizers for each resin which have very widely varying compositions.

*Flooring compounds*—barium-zinc systems with organic additives which vary with the type of filler employed.

*Injection moulding compounds*—Plasticized general purpose—barium-cadmium soaps with epoxy and chelating agents. Plasticized transparent compounds—organotins. Unplasticized compounds — organotins. The most promising lines of development are in the field of liquid barium-cadmium compounds with a variety of additives. The organotin sulphur compounds will probably increase in importance over the next few years whereas the lead compounds are likely to decline to a considerable extent.

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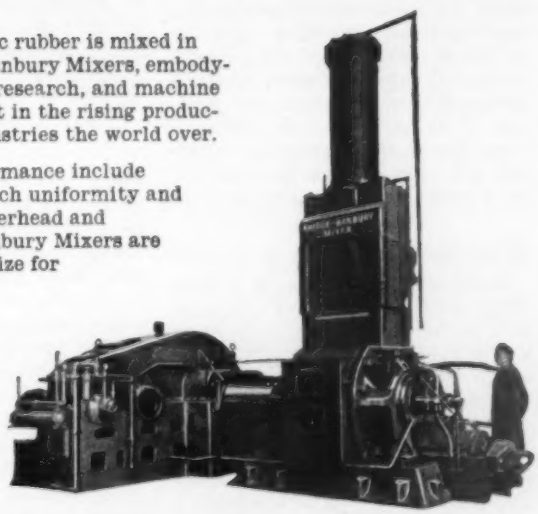

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# The Man Who Started It All

## CENTENARY OF GOODYEAR'S DEATH

By M. SCHOFIELD, M.A., B.Sc., F.R.I.C.

THE 100th anniversary of Charles Goodyear's death on July 1 brings to mind the grim struggle of this American to improve raw rubber so as to extend industrial applications in which he had committed his capital, chiefly borrowed from friends.

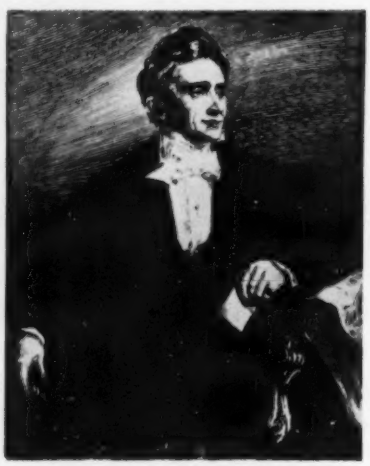
Goodyear was a gambler, a man always in debt and in poor health, one committed to prison at times for his debts. He had one lucky smile from fortune, one of those 'accidental discoveries' which enliven the history of science and technology. Yet that accidental dropping of a rubber sample incorporated with sulphur on to a hot stove did not bring him fortune, since he had no money to take out a patent for his vulcanizing process at the critical time. Although he deposited with the US Patent Office 'a claim for record' dated November 6 1841, he applied in America, England and France for the actual patent too late, since he had been anticipated by Hancock.

A true picture of Goodyear's endeavour, and of the rough experiments made prior to his fruitful one, is not given in those brief references to his accidental discovery. These seem to depict a fortunate man and rarely mention others in the field. Nor is an unbiased view obtained from American biographies which take little note of what Hancock and his partner Macintosh accomplished.

### Gum Elastic

Goodyear was the son of a New Haven hardware merchant who early took up his experimenting on crude rubber or 'gum elastic' as his life's work. Just as George Bissell got the inspiriation to drill for America's oil when he caught sight of a picture of a brine derrick in a shop window, so was Goodyear's attention drawn to rubber on noticing in a window a rubber lifebuoy and an advertisement of the Roxbury Rubber Company. The valve of the lifebuoy was of rough design; so Goodyear set to work to make a better one. When he visited a Roxbury shop to show the owner his improved valve, the owner was more taken with Goodyear's ingenuity. The Roxbury manager therefore impressed Goodyear with the urgent need for a curing process in the rubber industry.

In his subsequent experiments Goodyear kneaded raw rubber with very many reagents in a 'hit or miss' research, one example of a promising material being magnesia. Like other people in this period he coated textiles with his gum elastic and made shoes with it. Yet when hot weather



CHARLES GOODYEAR, 1800-1860

came, the failure of his processing became apparent, so that again he began a further series of trials involving the addition of every conceivable chemical. By 1837 with his funds exhausted and personal belongings in the pawn shop, Goodyear was relying on charity to maintain his family at New Haven, while he went to New York to carry on his experiments. A druggest provided him with rubber and additives to continue, and a friend gave him a room.

He took out a patent in 1837, one specifying nitrates of copper and bismuth and also lime as agents improving rubber. Once again he was financed by friends or others who saw possible success. He rented an abandoned rubber factory on Staten Island, made rubberized cloth and bandages, and even an entire suit and shoes.

'If you meet a man who has on an indiarubber cap, stock, coat, vest and shoes, with a rubber purse without a cent in it, that's Charlie Goodyear!' the saying went. Yet his obstinate belief persisted, with shoes, tablecloths and other articles sold to try and recoup losses at the Staten Island factory. His 1836 contract with the US Government for making mailbags of treated rubber did not bring him financial reward: the rubberized fabric did not withstand prolonged use.

A year later he met Nathaniel Hayward, former rubber worker in a factory. Hayward had experimented with sulphur dissolved in turpentine for treating rubber to eliminate its sticky properties, and took out a patent in 1839 the rights of which he assigned to Goodyear. Then in 1839 came the famous 'accident.' One version is that Goodyear, while arguing with his men, dropped his rubber-sulphur mix on a hot stove, discovering vulcanizing and bringing hard as well as soft rubber.

### The Flask from Lisbon

Since in 1843 the history of rubber includes Hancock and Macintosh with whom Goodyear had to negotiate, a review of events in Britain is necessary here. As long ago as 1776 a first hint at using rubber for boots and other articles is a reminder that Goodyear was no pioneer in this search for commercial outlets. In that year a British consul at Lisbon sent Matthew Boulton a small rubber flask '. . . made of an extraordinary substance, commonly sold here by the name of Borracha, but in Brazil from whence it is brought, it is called by the Indians "caoutchouc" . . . . Its elasticity exceeds greatly that of any other natural substance yet discovered; and the Chymists know a preparation of ether and two other substances capable of dissolving it.'

The report went on to describe how rubber gave 'no flavour or smell to any substance lodged in it, wine or brandy for example.' Boots, rubber figures of animals and erasers are all mentioned. In 1791 rubber dissolved in turpentine or other solvents was patented by Samuel Peel for use in waterproofing leather, textiles and other goods. Solutions of rubber in ether was used by a London pharmacist named Winch for making rubber tubes, while catheters of rubber also appeared early. Using wax moulds

dipped with latex rubber, boots and coach hoods were all being studied in Britain as well as in America.

In 1822 Charles Macintosh's patent for cementing two layers of cloth by use of a rubber solution in naphtha came as definite instance of this British development. Macintosh established his factory in 1821 for making coats, capes, cushions, lifebuoys, and other articles from 'dissolved gum elastic' interposed between two layers of textile, the first factory being in Glasgow and then in Manchester. Macintosh bought later a 'cold cure' idea from the Birmingham inventor, Alexander Parkes, the father of the plastics industry whose nitrocellulose 'Parkesine' came too early for appreciation by industry. Parkes immersed rubber in such reagents as sulphur chloride and carbon disulphide; yet he was so taken up with his waterproofing by nitrocellulose that Macintosh was able to obtain all rights.

Macintosh's partner, Thomas Hancock, was brother to the Hancock famous for running a service of steam omnibuses in England, and was equally versatile in his ideas. Like Goodyear he tried all kinds of additives in his experiments with rubber, with white lead, talc and magnesia as typical materials studied. Between 1820 and 1847 Hancock took out 16 patents for working rubber with various ingredients specified.

### Hancock's Contributions

One point arising from Goodyear's anniversary is that Hancock made important contributions to the advance of rubber technology. His mastication process for producing a dough-like mass from raw or scrap rubber is an example; while there was also his visualizing the importance of latex then known as 'milk' or 'sap.' This emphasis on Hancock's role is necessary since biographers in America ignore it at times—although this is by no means as true as it was, especially since Hancock was admitted to the Rubber Hall of Fame in Akron last November — while even the Encyclopaedia Britannica includes Goodyear in its notices without a word on Hancock. In his patent of 1843 Hancock described his vulcanizing process, and then in 1857 came his 'Origin and Progress of Indiarubber Manufacture in England' in which he told of experimenting with both molten sulphur and with sulphur plus rubber in hot turpentine.

In the litigation it turned out that Hancock in 1843 had made hard as well as soft rubber after he had seen a sample of Goodyear's preparation, this being sent to Macintosh without any disclosing of the actual treatment. The court upheld both Hancock's and Goodyear's patents; this after Hancock was called upon to give full details of experiments causing such duplicating of results.

The Goodyear interests had to come to terms with the Macintosh-Hancock combination with a licence granted to Goodyear to import overshoes. Yet since Hancock had omitted to register a patent in Scotland, the North British Rubber Company was brought into being.

After nearly ten years' struggle regarding rival processes, Goodyear was no better off financially. He staged a display of rubber products at an International Exhibition in London which cost him $30,000, while in 1855 he spent $50,000 in a similar display at the Paris Exhibition.

**An impression of Goodyear in his 'laboratory,' including the famous stove on which the first sample of vulcanized rubber is said to have been made.** *Pictures by courtesy of Goodyear Tyre and Rubber Co. (G.B.) Ltd.*

He was awarded the Legion of Honour by Napoleon III, yet his company there failed, Goodyear being imprisoned for his debts. The man who had spent a lifetime experimenting with rubber was borrowing thousands of dollars in his last years, pawning his wife's jewellery to pay his passage and leaving debts of $200,000 when he died. The rubber industry has turned over vast amounts of money since that time—yet the man who started it all got nothing.

## PI Training Grants 1960

THE Trustees of the Plastics Industry Education Fund invite, from young men or women now working in the plastics industry, applications for a limited number of training grants towards the cost of full-time study on an approved course leading to a degree, diploma or other equivalent qualification in science or technology, or in industrial design. Approved courses for full-time study include those leading to the Graduateship of the Plastics Institute, degree courses in chemistry, physics and engineering, sandwich courses in similar subjects for the Diploma in Technology (Dip. Tech.) and certain courses in industrial design.

Grants are usually made for periods of one year at a time, but applications for the renewal of grants are considered provided the candidate is making satisfactory progress. The value of the grants is normally of the order of £100, but smaller sums will be awarded by the Training Grants Committee when other resources are available to the candidates. Applicants will be expected to have approached the appropriate local education authority for financial assistance.

Applications for Training Grants must be submitted in writing to the Secretary, The Plastics Institute, 6 Mandeville Place, London, W.1, by July 15 1960.

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A beaker-with-holder set has just been introduced by Mendle Bros. Ltd. of Pontygwaith, Glamorgan. Moulded in Rigidex high density polythene, the set is primarily intended for serving hot drinks. A novel feature is that the holder is designed so that there is a small air space beneath the base of the beaker.

# Air-sprung Ambulance

## FIRST FOR FACTORY USE TO HAVE PNEURIDE

THE Speke factory of the Dunlop Rubber Co. Ltd. recently took delivery of a new ambulance for internal factory service. A feature of the ambulance is its air suspension which provides consistently smooth riding under all conditions. A number of ambulance authorities are now using the Dunlop system of air suspension but this is the first factory ambulance to be so fitted.

Local medical officers of health and ambulance officers who inspected the new ambulance last month were greatly impressed by the absence of vibration and the patient comfort given by the system. They also toured the impressively well equipped factory hospital and saw a new film demonstrating the use of a Dunlop device in surgery.

The ambulance, a BMC 'LD' Series vehicle is equipped at the rear with Dunlop Pneuride 9½in. diameter bellows air springs (*RJIP* September 14 1957, 359). These are manufactured of nylon reinforced rubber and are available as standard from one to four ton capacity. Maximum strokes are 6in. for the 1-4 ton springs and 9in. for the 2-3 ton springs. All sizes are made in two convolution form but the latter is also available in three convolution form to give a longer stroke if desired.

The air springs as fitted to the ambulance operate at pressures of 82 psi laden, 32 psi unladen, and the system is designed for wheel frequencies as follows:

| | Laden cpm | Unladen cpm |
|---|---|---|
| Rear (air) ..... | 82 | 93 |
| Front (leaf) ... | 98 | 110 |

This effectively illustrates the smooth ride given by the Pneuride springs under laden and unladen conditions.

The air supply is provided by a belt-driven compressor which delivers air through a pressure limiting safety valve and a non-return valve to a 400 cu. in. reservoir at 200 psi, thence via levelling valves to the air springs and their associated 300 cu. in. extra volume tanks.

Another notable feature of the ambulance is the all glass-fibre resin body which reduces both weight and maintenance.

**Interior view of the new ambulance with F. P. Fraser, Dunlop Rubber Co. Ltd.** *(left)*, **and Professor Andrew Semple, Medical Officer of Health, Liverpool**

# Power Transmission Advance

## NEW FLEXIBLE COUPLING INCORPORATES RUBBER SLEEVE

R. AND J. DICK LTD., the power transmission engineers, have introduced a new type of flexible coupling incorporating a rubber sleeve which is said to provide dependable power and withstand all types of misalignment and end float. The coupling, which is called Quadriflex, is described as a big advance in power transmission.

**The coupling gives four-way flexibility and withstands angular and parallel misalignment. A subsidiary advantage is that the rubber sleeve acts as an electrical insulator between the driver and the driven unit**

It has exceptional torsional flexibility: 15° at peak torque compared to 1° to 3° for other types—and the ability to absorb vibration and shock results in smoother operation for both driver and driven equipment. The design is simple. The coupling consists of two flanges and a two-piece flexible rubber sleeve. The teeth of the sleeve halves lock into the teeth of the flanges without clamps or screws and tighten under torque to provide smooth transmission of power.

The coupling is easily installed and a retaining ring is supplied for high speed.

### Four-way Flexibility

As the name implies, the Quadriflex is designed to provide all the four degrees of flexibility, angular misalignment up to 1°, parallel misalignment up to $\frac{1}{16}$in. (depending upon shaft size), free end float up to $\frac{1}{8}$in. (depending upon coupling size) and torsional load (vibrating, uneven and shock). No destructive overhung loads are placed upon driver or driven shafts thus assuring longer bearing and shaft life. Angular or parallel misalignment does not generate unbalance or pulsations, for all the flexing takes place within the rubber sleeve.

PHOENIX PROOF REGD.
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PLIOCENE REGD.
Leather Cloth
ENVERDAIM REGD.
Suedette Fabrics

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# Flexible Ducting Conference

SALES conferences are usually much brighter than reports of them. Not so with Flexible Ducting Ltd., the vigorous associate company of George MacLellan. A flippant camera-man and a candid caption writer (Robin MacLellan, director of Flexible Ducting) were let loose at the company's first international distributors' sales conference — with the following results. (*See also* '*The Truth at Last*' *page* 979.)

*Left,* **Flexible ducting has bores of all sizes** (*Sandys of Flexible Ducting and advertising manager, MacLaren); right,* '**Look, Mum—no fingers!**' (*Darkins, Flexible Ducting's manager, to Wainwright of Glover and Wood).*

'**I plead guilty to selling Spiratube, m'Lud**' (*Taylor of Central Manufacturing and Trading Co. (Dudley) Ltd.)*

*Left,* **The jury considers its verdict . . .** (*Hutchinson of Atholl Asbestos Co. Ltd. and Reid of MacLellan's, London); right,* '**We plead guilty too**' (*Glover and Goodison of Glover and Wood Ltd.)*

**Swedish Repsody** (*Erikssen and Christiansen of Gerber and Hesslow, Sweden, and Miller of Flexible Ducting)*

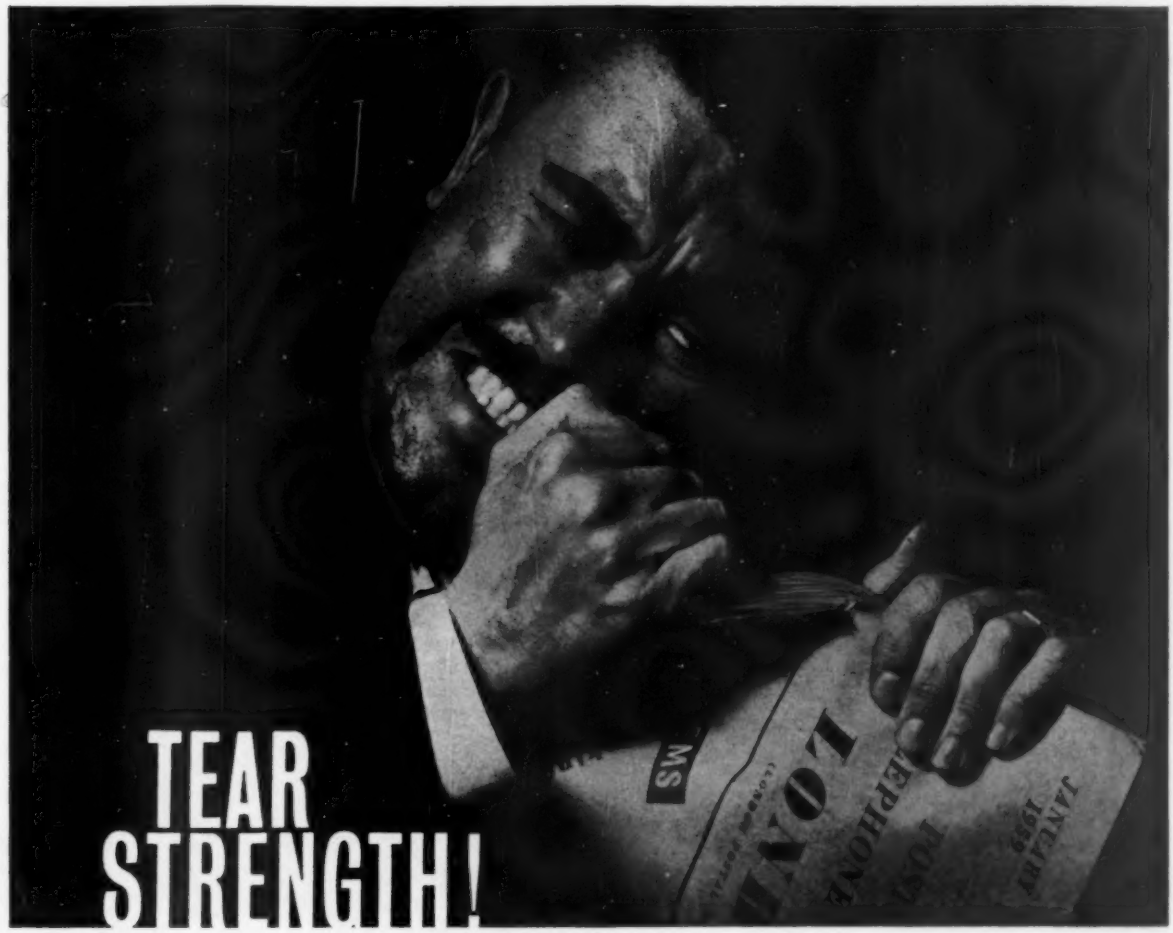
'**Think they'll swallow it, John?**' '**Judging by all they've eaten so far, they'll swallow anything**' (*Sandys of Flexible Ducting to John MacLellan of Geo. MacLellan)*

'**Call me a flexible duck once again, and I'll do yer!**' (*Downs of MacLellan's, London, to Bennett of Robert Stotesbury and Co. Ltd.)*

'**Bet you couldn't play a tune on Flex-flyte, Hector**' (*Downs of MacLellan's London to colleague MacInnes, ex-junior bagpipe champion)*

**Bartholomew of Avica pours coffee for two, while colleague Walls prepares pistol for one (he's tasted the coffee before)**

'**It was meant to be round, but some square got hold of it**' (*Basil MacLellan of Geo. MacLellan and Co. Ltd. to two Thermotank representatives)*




## *But nothing to the tear strength you get in rubber with Crosfield white fillers*

If tear strength is a quality you want in *your* rubber, then Crosfield white fillers can almost certainly help you.

For instance, tests incorporating Alusil or Microcal in resin rubber compounds have recorded tear strength values *exceeding* 600 p.s.i. at 80 to 90 loading.

It may be, of course, that you're looking for some property other than tear strength in your products. Perhaps it's good tension and compression set; or hardness; or a low Mooney viscosity. But whatever it is, Crosfield feels certain that Alusil or Microcal can help you there, too.

Tell you what. Drop a line to the address below and we'll be pleased to send you full details of these remarkable white fillers. That way, you'll be able to judge for yourself.

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*—give the properties you want in rubber*

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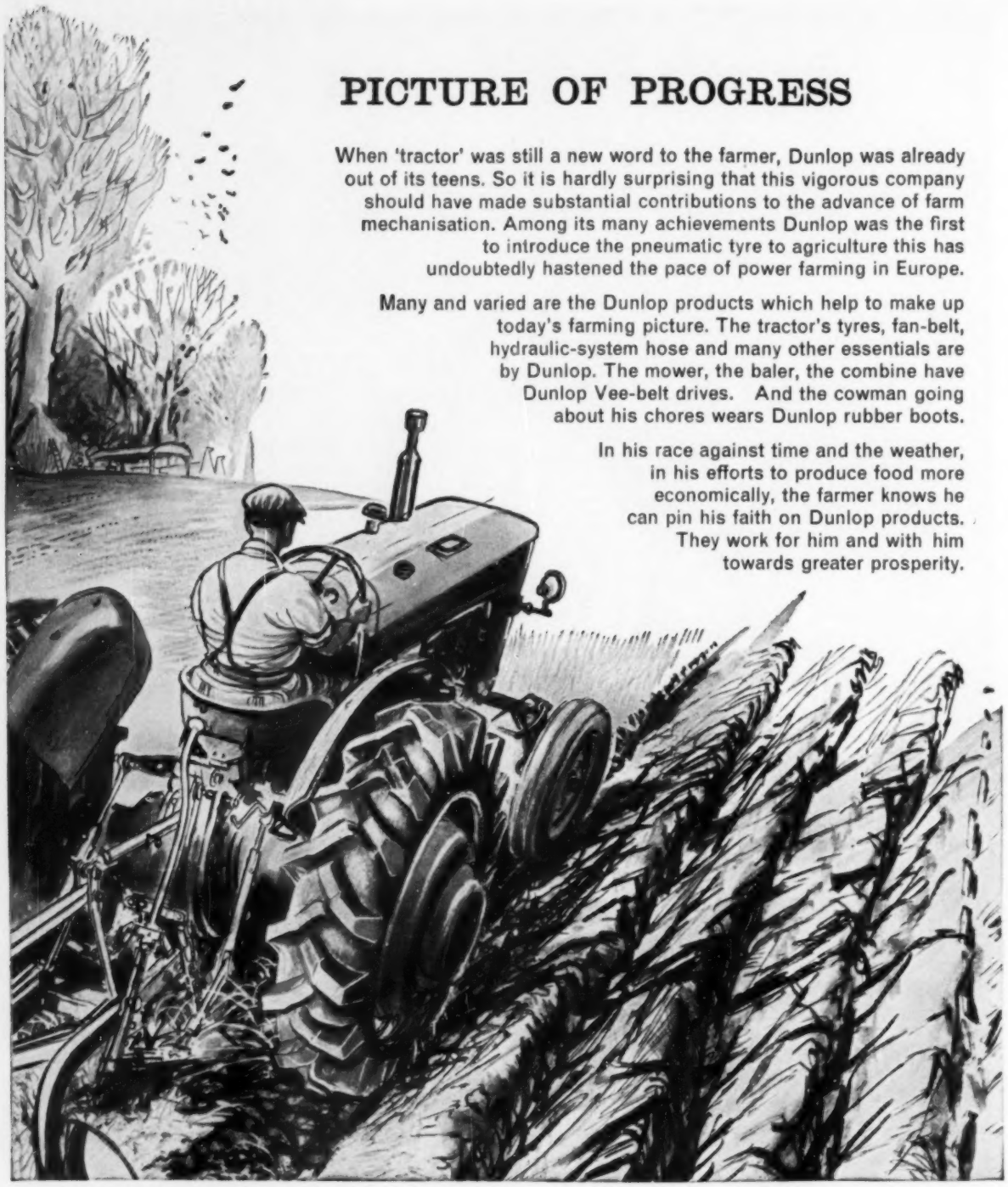

# PICTURE OF PROGRESS

When 'tractor' was still a new word to the farmer, Dunlop was already out of its teens. So it is hardly surprising that this vigorous company should have made substantial contributions to the advance of farm mechanisation. Among its many achievements Dunlop was the first to introduce the pneumatic tyre to agriculture this has undoubtedly hastened the pace of power farming in Europe.

Many and varied are the Dunlop products which help to make up today's farming picture. The tractor's tyres, fan-belt, hydraulic-system hose and many other essentials are by Dunlop. The mower, the baler, the combine have Dunlop Vee-belt drives. And the cowman going about his chores wears Dunlop rubber boots.

In his race against time and the weather, in his efforts to produce food more economically, the farmer knows he can pin his faith on Dunlop products. They work for him and with him towards greater prosperity.

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HOSE · BELTING · RUBBER MOULDINGS DOMESTIC AND INDUSTRIAL RUBBER GOODS · SPORTS GOODS, etc.

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# MEN *and* MATTERS

## *A Review of People and Events*

*by George A. Greenwood*

I AM very interested to get the preliminary programme for the annual meeting at Cardiff in the late summer —from August 31 to September 7— of the British Association for the Advancement of Science. The venue has been well chosen, for not only is Cardiff, with its great civic centre in Cathays Park, the hub of industrial and scientific activity in the Principality, but it is also the focal point of a good deal of progressive activity, both in rubber and in plastics. Certainly a good deal has happened since the Association first visited the city in 1891, and even since I was attending its meeting on the second occasion in 1920.

This is a massive affair, for the sessions go on for many days and there are probably a score of sections devoted to various branches of scientific activity. I notice that in the chemistry section one of the vice-presidents is Dr J. J. P. Staudinger, and that the recorder is Dr I. J. Faulkner of Stockton-on-Tees, both probably equally well known to us on the plastics side. In the engineering group, the senior vice-president is Sir Ewart Smith, F.R.S., still so much thought of by us who knew him in his I.C.I. days, and in discussions on the physical sciences and engineering, the topics include the technical development of polythene, polymer chemistry, and silicones, all of which should be worth following.

As usual there are to be a number of sectional excursions, during which members and visitors so minded can tour the factories of British Nylon Spinners Ltd. at Pontypool, the Midland Silicones Ltd. at Barry, Monsanto Chemicals Ltd. at Newport, and the Plastics Group of Distillers Ltd. at Sully, on the Glamorgan coast, a few miles from the capital.

**'Endeavour Prizes'**

Particularly interesting this year is the organization of competitions under the title 'Endeavour Prizes,' in which awards totalling 100 guineas are offered by I.C.I., who, of course, publish the quarterly scientific review, 'Endeavour,' for essays submitted on scientific subjects. This has already been publicized, and in addition to the cash prizes, winners will be entertained through the BA meeting at Cardiff, all expenses paid, including the cost of travel within the UK.

We are told that as the primary purposes of these awards are to stimulate younger scientists to take an interest in the work of the British Association, and to raise the literary standard of scientific writing, the competition is restricted to those whose 25th birthday falls on or after June 1 1960. One of the topics out of six for the essays is the role of chance in scientific discovery. This, with any sort of luck, should produce work as interesting to those who practise the application of scientific knowledge to industry, as to those who are pure scientists and nothing else.

The president of the Association this year is Sir George Thomson, F.R.S., who bears an honoured name in science, not only for his own achievements but also for those of his family who have gone before him. The subject of the presidential address by this Master of Corpus Christi College, Cambridge, is to be 'The Two Aspects of Science.' It should be worth hearing, and for those who cannot hear it, worth reading.

**The Truth at Last**

I was amused to see the report on the Flexible Ducting sales conference (this issue, page 976). It certainly makes a refreshing change, and doesn't mean that the conference, which was held in Glasgow was any less businesslike or informative, as can be seen from some of the papers delivered. These included 'Technical Data on Spiratube and Flexflyte,' by Mr B. Miller, I.Mech.E., development engineer of Flexible Ducting Ltd., and papers on the use of flexible pipes in air conditioning and aircraft.

Attending the conference were 35 representatives from home and overseas distributors, including guests from Sweden, Norway, Denmark and Germany.

According to Robin MacLellan, director of Flexible Ducting Ltd., the last day of the conference included a visit to Loch Lomond, but I think here he is disguising the truth. The firm did visit a loch—but surely it was Loch Ness. It must have been perfectly clear for some time to everyone in the industry that the Loch Ness Monster is nothing more than an enormous piece of Flexflyte. Or is it Spiratube?

**H. V. Blake has been appointed commercial manager of Glass Yarns and Deeside Fabrics Ltd., a member of the Microcell Group. Mr Blake is chairman of the BPF Reinforced Plastics Group**

**A Rugs Protector**

It is always interesting and worth while to hear of progress and development in the application of the raw materials and the articles made from them.

This week comes news of a one-piece castor to protect carpets from being worn by furniture legs. These, we are told, and the evidence of it supports it, eliminate pile-crushing, matting, stains and rust marks in soft surface installations. A further point is that furniture can be rearranged with no tell-tale marks on the former furniture placement. Apparently the secret is that the castor cups have teeth that extend through the nap of the carpet to the base. In this way the weight of the furniture is transferred to the base rather than to the nap itself, and the nap remains springy and resilient. Other unusual features of the new cups, moulded from Union Carbide C-11 styrene acrylonitrile copolymer and known as 'Carpet Guards,' are exceptionally high flexural strength and they also are highly resistant to damage caused by carpet cleansing detergents.

**'Service With a Smile'**

I like those records which pay tribute both to the durability of goods and the politeness and consideration of those who sell them. Here is one collected from a popular Sunday newspaper, signed by T. R. Jenkins of Weybridge, Surrey, who writes:

'A remoulded tyre I bought for my car developed a fault after only 500 miles. Furious, I drove to the factory

where it was made, ready to blow both the factory and everyone connected with it into small pieces.

'I left with my anger extinguished, for the manager:

1. Took one look at the tyre and said it was clearly a manufacturing fault.
2. Cut it open to explain the fault to me.
3. Called up two workmen to fit a new tyre while I waited.
4. Took me on a conducted tour of the factory—"just to restore your faith," as he put it.'

Query: Which and where was the factory at which Mr Jenkins had this entirely pleasant and most satisfying experience? One would really like to know.

**For Washington D.C.**

Dr Harry Hookway is to be the new director of the UK Scientific Mission in Washington D.C., and scientific attaché at the British Embassy there. Dr Hookway, who is 38, is the assistant director of the National Chemical Laboratory, where he has been since joining the Department of Scientific and Industrial Research in 1949. He is well known for his work on polymers, ion-exchange resins and saline water conversion.

Educated at London University, he has held research posts in industry, and has been lecturer in organic chemistry at Battersea Polytechnic, where he obtained his Ph.D.

**Joint MDs**

Dexine Rubber Co., of Rochdale, have appointed W. E. Foreman and J. T. Hull joint managing directors of the company.

Mr Foreman has been with Dexine for 42 years. He was appointed works

W. E. FOREMAN J. T. HULL

manager in 1935, and has been on the board since 1946. During the war he served on the ebonite panel of the technical committee of FBRAM.

Mr Hull began his career with BTR at Silvertown. In 1941 he was appointed chief chemist of the Morgan Ebonite Co. and joined Dexine as chief chemist in 1947. He became a director in 1958. He has served on many technical committees.

As well as a common interest at work, both men have a common hobby: photography.

**C. H. J. Avons Joins Monsanto**

C. H. J. Avons has joined the rubber technical service group of Monsanto Chemicals Ltd.

Mr Avons, who is a Fellow of the Institution of the Rubber Industry, and 1959/60 chairman of the London section, comes to Monsanto after service with the Avon India Rubber Company and St. Helen's Cable and Rubber.

* * *

Seen on America's Coney Island: new sun-tan hats vacuum-formed from lightweight sheet of Tenite polythene. The hats are textured to resemble various kinds of exotic straws including balibuntal, coca, Milan, Leghorn, and Panama.

* * *

A party of 120 youngsters from the Quarriers' Homes, Bridge of Weir, went to Edinburgh last week as the guests of India Tyres, of Inchinnan. The children travelled in 50 private cars, and the RAC provided a special escort for the party.

# Question Corner—123

**(Second Series)**

**448. How can the problem of shrinkage in the injection moulding of polythene products be overcome?**

*(Answer next week)*

## Answer to Question Corner—122

**447.** In the adaptation of extruders to bottle blowing, several techniques have been used.

In some cases the extruder is fitted with one or more fixed nozzles. The molten polymer is extruded from these to form a pipe-shaped preform, called a parison, which is immediately enclosed by a bottle mould. By introducing air, the parison is then expanded to the shape of this mould. In most cases of this type, the extruder is turned on and off for short intervals to produce the parison, or to stop the flow of polymer while the extruder parison is blown into the bottle mould.

In another method, the extruder is equipped with multiple nozzles and a rotary feed mechanism which permits the extruder to be operated either continuously or almost so, while the flowing molten polymer is diverted from one nozzle to another. Here also, a molten parison is immediately enclosed by a bottle mould and then blown to conform to its shape.

A single fixed nozzle or die is used in another adaption and the parison is fed continuously to a rotary table, which is equipped with multiple moulds. The rotating table picks up the parison and closes the mould, air is injected, and the bottle blown, cooled and ejected automatically. Good flow properties are required from the resin so that the parison can be extruded in the minimum time and temperature. Poor flow, as well as a poorly designed extrusion die, will produce varying degrees of melt fracture which will impair the surface appearance.

For non-critical applications where resistance to environmental stress cracking, absorption or tensile strength are not essential, polythene resins of intermediate density and of melt index in the range 3.0-5.0 are used. More critical applications demand higher density resins. Wherever resistance to environmental stress cracking is required, then lower melt index resins are indicated.

*(Another question next week)*

*'Photodegradation — Postcards you buy at the seaside'*

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# Companies in the News

### CIBA

In 1959 total CIBA sales to customers amounted to Sw. frs. 1,026m. Net profits for the year rose by Sw. frs. 2,949,401 (£245,780) to a new level of Sw, frs. 27,261,219 (£2,271,780). Out of this it was decided to allot Sw. frs. 7,700,000 (£641,666) to certain Welfare and Research Funds. These figures were revealed by Dr Robert Käpelli, chairman, in his annual report.

He went on to say that production of CIBA (ARL) Ltd. has increased; a new formalin plant was completed during the year and has doubled formalin production.

The company's export business has been hampered, he said, by the high prices of some of its British-made raw materials. For instance, methanol made in the UK was more expensive than methanol imported from USA or Germany, although the imported material paid a duty of 33.3%. An application for removal of this duty was now under consideration by the Board of Trade. Paradoxically there was little or no duty on the imported finished plastics products made by foreign competitors with access to raw materials at world prices.

In spite of these difficulties the company was optimistic about prospects for 1960.

### Farbwerke Hoechst A.G.

Hoechst's investment activity in 1959 continued to be centred around the further expansion of the basic petrochemical plants and the erection of further installations for the production of polyester fibre. This is disclosed in the group's annual report, which shows that turnover rose by 17.6% to DM2,222m.

20% of this turnover is shown to be in plastics, solvents and lacquer components. Turnover in polythene and polypropylene rose considerably. The volume of sales, which increased by 75% compared with the previous year, was said to be limited by existing capacity.

Among man-made fibres, output of Trevira, the polyester fibre, was fully sold and the increase in demand is likely to be satisfied during 1960 as the additional production installations come into service stage by stage. Sales of plastic foils distributed by Kalle AG increased steadily.

Bunawerke Hüls (of which Hoechst has a 16⅔% holding) increased production during the year.

### Permali

A final dividend of 6% by Permali makes 9% for the year to end-March 1960, compared with the previous year's single 5%.

Profit for the British companies increased to £102,393 from £57,019, before tax of £45,750 (nil), and the proportion of net profits earned in North American subsidiaries amounts to £5,609, against a previous loss of £22,318.

### BTR Interim 5%

BTR Industries is restoring its interim to 5% for the year to end-September 1960. A year ago the payment was halved to 2½%, but was followed by a maintained 10% final, making 12½% against 15%.

The directors state that the improvement in the group's trading which became evident in the closing months of the last financial year has continued, and trading profit for the first six months of the current year shows an encouraging increase.

### RFD

The RFD Company (aeronautical and marine life-saving equipment, textile screen printing) announces a final dividend of 14% on capital increased by £100,000 under the acquisition of Perseverance Mill. With the interim on the old capital this makes a total of 20% for the 15 months to March 31 1960.

### E. and E. Bottomley

Profit announced by this company, manufacturers of tyre fabrics and belting ducks, was £60,021 before tax—an increase of £24,766 over the 1958 figure.

The chairman, Mr E. Bottomley, said that the order book was full and that additional modern plant had been ordered costing £25,000 which would considerably increase production.

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Bayer's external business increased by DM448.7m. to DM2,459m. in 1959. Export sales for the first time passed the DM1,000m. mark. They increased by DM223.5m. to DM1,065m., according to the report issued at the annual general meeting.

Almost half of the increase in turnover during 1959 was produced by plastics and plastics' intermediates, as well as man-made fibres, with the synthetic fibres 'Dralon' and 'Perlon' said to be doing particularly well. Sales of synthetic rubber and rubber auxiliaries 'developed exceptionally fast.'

The growing demand for the company's products resulted in steps being taken to increase production capacity during 1959. Capital expenditure—DM284.4m. — was again mainly directed at the extension of installations for the production of synthetic fibres, plastics and pigments.

Among subsidiaries mentioned were the Progil Bayer Ugine Co. of Paris, which is to manufacture isocyanates, polyesters and polyether. The Mobay Chemical Co. in USA has raised its output of intermediates with an isocyanate basis.

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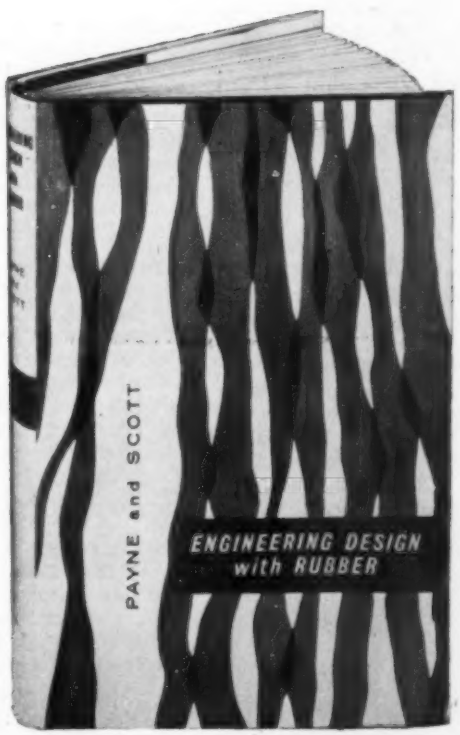


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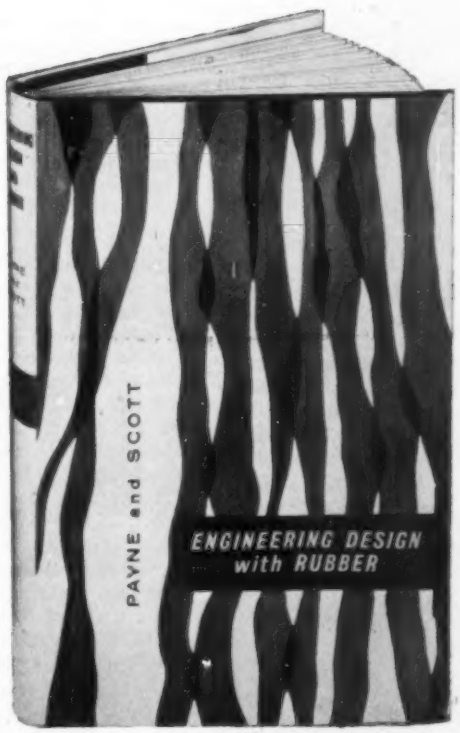


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# Amsterdam Plastics Conference

THE provisional programme of the 1960 International Congress on the technology of plastics processing, which will be held at Amsterdam from October 17-19, has just been released.

Papers arranged for the first section, on processing techniques and principles of machine design, will be given by Herbert Goller and Dr Eng. A. Kleine-Albers (Ankerwerk), H. Domininghaus (Hoechst), H. Beck (BASF), H. C. M. Smit (Philips, Eindhoven), L. W. Turner (Yarsley Research Laboratories, Oaklands), Dr J. F. Salhofer (Kleinewefers Söhne, Krefeld), Richard L. Ballman (Monsanto): 'Prediction of the flow of a polymer melt into a cold cavity'; B. H. Maddock (Union Carbide): 'Pressure Development in Extruder Screws'; Robert E. Colwell (Monsanto): 'The Response of Polymer Melts to Shear,' and R. N. Wetterholt (Amcel Co. Inc.): 'The Dependence of the Macroproperties of Blow Moulded Objects on Process and Machine Design Variables.'

Processing behaviour of specific plastics will be the theme of section 2. Papers given will be by J. Ch. F. Kessler (NV Research, Arnhem): 'The Importance of Moisture Control in the Processing of Nylon'; J. L. Voigt (AKU): 'Extrusion of Nylon Rod'; Dr G. W. van Raamsdonk (Koninklijke/Shell Plastics Laboratorium, Delft): 'Processing of Polypropylene'; L. H. Krol (Koninklijke/Shell Plastics Laboratorium, Delft): 'Comparison of the Behaviour of Low and High Density Polyethylene, Polypropylene and Hard PVC in a Single Screw Extruder'; Ben P. Rouse, Jun., Ph.D. (Eastman): 'The Control of Processing Variables in High Speed Wire Coating of Polyolefins'; W. R. Reinbacher (Du Pont): 'On Methods and Problems of Extruding Acetal Resin'; Dr Chr. A. van Gunst (Staatsmijnen in Limburg): 'Toughness of Injection Moulded Articles from High Density Polythene'; Dr Baird (I.C.I. Plastics Division): 'On the Processing of Methylmethacrylate Granulates and Powders'; Mr Backofen (Bayer): 'Injection Moulding of Polycarbonate' and L. Dijkema (Plastics Institute TNO, Delft).

Papers in the third section, on miscellaneous processing techniques, will be given by K. J. Brookfield (Fibreglass): 'The Suitability of Various Finishes of Glass Fibre with a View to the Processing Techniques of Glass Fibre Reinforced Materials'; Dr Ing. F. Stastny (BASF): 'The Manufacture of Plastics Foam from Polystyrene'; Dr H. A. K. Eden (Philips), Dr H. P. Zade (Rediweld Ltd.): 'The Application of Some New Techniques in the Heat Forming of Thermoplastics for the Construction of Chemical Plant'; B. van Rooijen (Aust and Schüttler), Dr Rudolf Kleinsteuber (Henschel-Werke), Mr Keesen (Bayer).

**The door lens forms an integral part of this de-luxe model Parnall tumbler dryer. It is moulded by the plastics division of UMP, Salford, using BRP's Tyril 767 styrene/acrylonitrile copolymer. This material replaces the glass and metal pressings used on a previous model**

## Tyres at Sea

What are said to be the two largest and most expensive ships' fenders in the world got their first taste of seawater recently in Heysham Harbour. They were used when big oil tankers transferred their cargoes to other tankers in deep water, and made the operation safer.

Each fender consists of five enormous Firestone tubeless tyres, each over 9ft. in diameter and weighing over 25cwt., all mounted on wheels on one horizontal axle. Each fender weighs 8 tons and has to take the crushing weight of two ocean-going tankers. They were designed by Marinecraft Constructors Ltd. and built by G. Marshall and Sons of Gainsborough for use by Shell Tankers Ltd.

## PLASTICS MATERIALS SALES

NET sales of plastics materials in the first quarter reached a new high level at 146,400 tons; 33,000 tons, or more than 29% higher than in the first quarter of 1959, according to Board of Trade statistics issued on June 21. The steady build-up of manufacturers' stocks during the second half of last year continued and in the first quarter of 1960 total stocks of materials (mainly thermoplastics) rose by 4,300 tons to 66,000 tons.

The highest rate of expansion continued to be in the thermoplastics group, total sales of which were 92,000 tons; about one-third higher than a year ago. In terms of volume polythene and polyvinyl chloride contributed most to expansion in this group. However, sales of thermosetting materials in the first quarter (55,000 tons) showed an exceptionally large increase (nearly 10,000 tons, or 22%) on the level of the previous year. Sales of aminoplastics increased very markedly. Sales of polyesters and epoxide resins, although still relatively small, continued to show a rapid increase.

Exports of plastics materials (excluding waste and scrap) in the first quarter were 42,000 tons, the highest for any quarter so far and about 29% higher than in the corresponding period in 1959. Imports during the quarter at well over 22,000 tons were also at a high level, more than double that in the first quarter of 1959.

Full figures, by quarters, for 1959 were published in *RJIP* March 19, 444.

NET SALES OF PLASTICS MATERIALS, FIRST QUARTER 1960
*(in thousand tons)*

| | Jan.-Mar., 1959 | Jan.-Mar., 1960 |
|---|---|---|
| Thermosetting materials: | | |
| Alkyds | 11.5 | 12.8 |
| Aminoplastics | 12.6 | 16.0 |
| Phenolics and cresylics | 17.3 | 20.2 |
| Polyesters | 1.5 | 2.3 |
| Other (a) | 1.8 | 3.3 |
| Total thermosetting | 44.7 | 54.5 |
| Thermoplastic materials: | | |
| Cellulose plastics | 2.6 | 3.1 |
| Polyvinyl chloride (b) | 20.2 | 26.0 |
| Polystyrene | 8.5 | 10.7 |
| Polyvinyl acetate | 3.0 | 3.9 |
| Polythene | 34.3* | 29.0 |
| Other (c) | | 19.1 |
| Total thermoplastic | 68.6 | 91.8 |
| Total, all plastics materials | 113.3 | 146.4 |
| Stocks at end of period: | | |
| Thermosetting materials | 16.7 | 18.6 |
| Thermoplastic materials | 40.8 | 47.4 |

*Note:* Any apparent discrepancies are due to rounding of figures.

(a) Including epoxide resins and casein plastics.

(b) Excluding sales of resins (*i.e.* polymers sold as such).

(c) Including acrylics, polyamides, polytetrafluorethylene, polyvinyl chloride resins (*i.e.* polymers sold as such).

* This figure includes polythene.

# Rubber Statistics

## FRANCE AND CANADA

THE latest Bulletin issued by the Secretariat of the International Rubber Study Group gives details of the French and Canadian rubber positions in January of this year.

### France

During January, France imported 7,089 tons of crude natural rubber and 390 tons of latex, the total, 7,479 tons, being some 2,000 tons less than the amount imported during January of last year. Of this quantity, 3,851 tons came from Malaya and 2,712 tons from Vietnam, with smaller quantities from the French Community and Ceylon, the Belgian Congo and Indonesia. After allowing for exports of 125 tons, there remained a new supply available for consumption of 7,354 tons.

Actual consumption of natural rubber during the month totalled 11,422 tons of natural rubber, and included 10,194 tons of crude and 1,228 tons of latex. This was only some 500 tons below the consumption figure for January of last year. Stocks of natural rubber on hand at the end of January stood at 9,000 tons of crude and 1,391 tons of latex, having risen by nearly 2,000 tons during the course of the month.

Imports of synthetic rubber during January amounted to 7,102 tons, of which 5,565 tons came from the USA and 328 tons from Canada. Of the total, 4,798 tons consisted of S-Type synthetic, 1,493 tons of neoprene, 286 tons of butyl and 302 tons of N-type synthetic. After allowing for exports of 351 tons, there remained available for consumption a new supply of 7,526 tons. The actual consumption figure for the month was 7,263 tons, an increase of almost 2,000 tons compared with the consumption figure for January of last year, and stocks at the end of the month stood at 9,265 tons, having amounted to 9,003 tons at the beginning of the year.

### Canada

Production of synthetic rubber in Canada during January amounted to 12,596 tons, of which S-type synthetic accounted for 7,473 tons and butyl for 2,537 tons; a year previously synthetic production had been virtually at the same level. Imports of synthetic during the month amounted to 1,295 tons, practically all of which came from the USA. Home consumption of the synthetic (a large proportion of which is, of course, exported), amounted to 4,797 tons, as compared with 4,394 tons a year previously, 4,030 tons consisting of S-type, 239 tons of neoprene and 404 tons of butyl. Stocks of synthetic on hand at the end of the month amounted to 9,912 tons, an increase of about 1,000 tons during the course of the month, and included 7,309 tons of S-type, 414 tons of neoprene and 926 tons of butyl.

Imports of natural rubber into Canada during the month included 1,716 tons from Malaya and 427 tons from Ceylon, amounting in all to 2,633 tons and including 2,384 tons of crude and 249 tons of latex. In January of last year, imports of natural amounted to 3,727 tons, and included 3,347 tons of crude. Consumption of natural during the month totalled 3,101 tons of crude and 240 tons of latex, and was virtually unchanged compared with the consumption figure for the previous January. Stocks of natural on hand at the end of January included 3,812 tons of crude and 331 tons of latex, having remained practically stationary over the course of the month.

Home production of reclaim amounted to 436 tons, compared with the earlier figure of 506 tons, while consumption, at 1,492 tons, compared with the earlier figure of 1,392 tons. Stocks of reclaim rubber on hand at the end of January totalled 1,624 tons, having fallen by nearly 50 tons during the month.

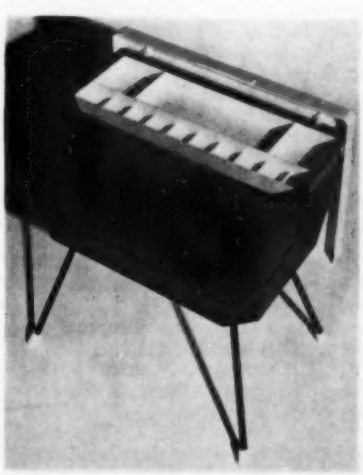
# Book Review

COMPILATION OF STANDARDS RUBBER PRODUCTS, D-11, pp. 1,052. (Philadelphia: American Society for Testing Materials.)

The 163 standards in this 19th edition of ASTM D-11 include 22 that are completely new and 66 that have been revised or changed in status. Among the new standards are several covering cellular materials of polyvinyl chloride or copolymers and urethane foam, two on the effects of radiation, one on abrasion resistance of rubber soles and heels, one on testing automotive air conditioning hose, and several on carbon black.

Selected topics include: chemical tests of vulcanized rubber; physical tests of vulcanized rubber; electrical tests; ageing and weathering tests of rubber; low-temperature tests of rubber; automotive and aeronautical rubber; packing and gasket materials; hose and belting; tape; electrical protective equipment; insulated wire and cable; hard rubber; latex foam, sponge and expanded cellular rubber; synthetic elastomers; compounding materials and nomenclature and definitions.

Copies of this book may be obtained from ASTM Headquarters, 1916 Race Street, Philadelphia 3, Pa., at $9.75 each, or from *RJIP* Book Department at 75s.



**Needlework casket moulded by Stewart Plastics from Monsanto's Lustrex polystyrene. It is fitted with detachable legs, fold-over hinged lid and removable tray**

## Boots, Boots, Boots

A feature of the display by North British at this year's public cleansing conference and exhibition at Portsmouth, which ended last week, was their exhibit of protective rubber footwear—wellingtons, thigh boots and ankle boots. A year ago the Scottish firm introduced the first crepe rubber boot in Britain, the Solway—a short-legged wellington. Now they have followed up with the Galloway, a full-knee wellington of crepe rubber, which, the company says, is already proving successful.

## Canadian Consumption Down

Consumption of all rubber in Canada in April declined to 8,508 long tons from 10,393 in the corresponding month last year, placing the January-April total at 39,062 long tons, a decrease of 2.4%.

April consumption of natural dropped to 2,739 long tons (3,734), synthetic to 4,367 long tons (5,085) and reclaimed to 1,402 (1,574). January-April consumption of natural fell to 13,157 long tons (14,352), while synthetic rose to 19,692 long tons (19,615) and reclaimed to 6,213 long tons (6,056).

## Fortafil A70

Imperial Chemical Industries Ltd. point out that Fortafil A70 has been incorrectly described as a product of the Metals Division (*RJIP* May 28, 832). The material, an amorphous, hydrated sodium aluminium silicate is produced by the Alkali Division, from whom information may be obtained.

# PATENT SPECIFICATIONS

*The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).*

### Floor Covering Material

No. 832,388. Armstrong Cork Co. Application and Filed, May 21 1957. Application in USA, June 7 1956. Published, April 6 1960.

A floor covering material comprises a surface layer of PVC composition, an intermediate felt layer containing butadiene-styrene copolymer as a binder, and a base layer of foamed latex rubber, adhesion between the layers being achieved without the use of an adhesive. The felt is prepared by the beater saturation process, the butadiene-styrene copolymer used as the binder containing 20% to 55% of styrene, preferably 50%. The foamed latex rubber base layer contains at least 50% by weight of a mineral filler, preferably 75%, in order to achieve suitable compression characteristics. The latex used in preparing the foam may be natural latex or a blend of natural latex and SBR latex containing up to 50% of SBR latex. In making the floor covering material, the PVC composition is applied to the felt layer by calendering or by the application of heat and pressure in a moulding press, and foamed latex is then spread on the free surface of the felt layer. Vulcanization of the foam may be effected by radiant heat, a strong bond between the foam and the felt being achieved.

### Cellular Rubber

No. 829,912. The B. F. Goodrich Co. Application and Filed, November 7 1956. Application in USA, November 8 1955. Published, March 9 1960.

The patent relates to a continuous process for the production of gas-expanded cellular rubber. Compounded rubber containing a chemical blowing agent is formed into a continuous sheet or strip, as by extrusion, and is conveyed through a heating chamber maintained at a temperature sufficient to cause the blowing agent to evolve a gas and expand the rubber. As the rubber composition is advanced through the heating chamber, surface contact between the rubber composition and the conveying surface on which it normally resides is broken by suspending the rubber composition at least momentarily and at frequent intervals in the air to allow the rubber composition to expand uniformly in all directions. This suspension of the rubber composition in the air may be effected by using a vibrator conveyor. If a closed-cell structure is to be formed, the rubber is partly vulcanized before it is blown. Examples are given relating to the production of cellular rubber from natural rubber, SBR, nitrile rubber and a blend of polychloroprene, natural rubber and SBR.

### Resinous Compositions

No. 830,751. British Industrial Plastics Ltd. Inventors: A. Brookes, R. F. Hill and H. May. Application, October 4 1956. Filed, October 3 1957. Published, March 16 1960.

Resinous compositions are made by reacting (a) an aminoplast reaction product of an aldehyde, an amino compound and an unsaturated aliphatic alcohol with (b) a polymerizable compound having ethylenic unsaturation. The preferred aldehyde is formaldehyde and the preferred amino compound is urea, while the preferred polymerizable compounds for constituent (b) are styrene, methacrylic esters, vinyl acetate and unsaturated polyesters. The products are valuable as a basis for air-drying coating compositions. With the addition of conventional driers, or catalysts and promoters, lacquers are obtained which dry and harden rapidly to give films with very good properties. The products are useful also for other purposes.

### Shorter Abstracts

*Removal of Flash.* 825,879. Air Reduction Co. Inc. Filed, July 27 1956.—In removing flash from rubber articles by freezing and tumbling, the articles are first cooled by liquid carbon dioxide and the temperature is then further reduced by decreasing the pressure in the chamber whereby at least part of the carbon dioxide is rapidly converted into vapour and solid snow.

*Copolymers of Propylene.* 825,885. Esso Research and Engineering Co. Filed, February 1 1957.—Propylene is copolymerized with a $C_{10}$ to $C_{24}$ monoolefin by means of a catalyst obtained by mixing a reducing metal compound with a reducible metal compound.

*Coating Compositions.* 826,009. Imperial Chemical Industries Ltd. Filed, February 1 1957. — Sprayable coating compositions comprise mixtures of polymethyl methacrylate and vinyl chloride-vinyl acetate copolymers, with or without a plasticizer, dissolved in a solvent.

*Rigid PVC.* 830,226. The B. F. Goodrich Co. Filed, January 23 1957. —Rigid PVC of high impact resistance comprises a mixture of 92.5 to 85.0 parts of PVC and 7.5 to 15.0 parts respectively of an elastomeric polyurethane.

## RABRM Translations

The latest list of RABRM translations, all of which have been made by R. J. Moseley, is:

USSR Specification GOST 7885-56. Carbon black for vulcanized rubber manufacture. USSR Komitet Standartov, Mer i Izmeritel 'nykh Priborov pri Sovete Ministrov Soyuza SSR. Class 421C41.

On the interaction of a motor-vehicle tyre with an obstacle. R. L. Guslitser (Trudy Nauchno-Issled. Inst. Shinnoi Prom., 1957, Sb. 3, p. 154-68). Class 66A44721.

On methods of assessing the useful storage life of vulcanized rubbers. A. S. Kuz'minskii and L. I. Lyubchanskaya (Kauch. i. Rezina, 1958, *17*, No. 6, 3-8). Class 6323.

Articles from latex and methods of their production. V. V. Chernaya (Khim. Nauka i Prom., 1959, *4*, No. 1, 50-5). Class 2621.

Molecular weight of carbochain polymers as a function of the degree of dispersity resulting from mechanical comminution. N. K. Baramboim and V. N. Gorodilov (Vys.Soed., 1960, *2*, No. 2, 197-9). Class 3S324.

Cis-trans isomerization of natural rubber under the influence of hydrogen chloride and ethyl aluminium dichloride. I. I. Boldyreva, B. A. Dolgoplosk, E. N. Kropacheva and K. V. Nel'son (Dokl. Akad. Nauk SSSR, 1960, *131*, No. 4, 830-2). Class 363.1.

Draft Specification M81-651 of October 1958. Coal Mining Equipment: Conveyor Belts. Charbonnages de France. Class 66B21.41.

**Prefabricated foamed polystyrene heating ducts, made from Monsanto Montopore foamable polystyrene by Wola Products Ltd., being laid in bungalow foundations on sites of the Hallmark Group in Worthing**

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# Plantation Share Survey

NATURAL rubber consumption during the first quarter exceeded estimates. The International Rubber Study Group have reported that world consumption in the first three months reached 510,000 tons. This was 32,500 tons more than had been expected. Despite stockpile releases stocks are considered to have shown little material change over the period. The total of 680,000 tons being 2,500 tons below the level of January 1 last.

The consumption figures allow for imports of nearly 50,000 tons by China and just on 24,000 by Russia. Chinese imports show an impressive increase on the corresponding total for a year ago of 35,500 tons. Russia on the other hand took a good deal less than the January-March 1959 amount of 39,500 tons. It will be remembered that the Communist authorities said that they would suspend purchases of natural rubber in the world markets during the first quarter of this year, in an obvious attempt to depress the high price level. That policy, however, has now been dropped.

Total new rubber consumption in the USA in April reached 132,700 tons of which 31.8% consisted of the natural product. For the first four months of the year new rubber consumption totals 558,300 compared with 543,000 tons in the same period of last year. The natural quota was 181,800 tons or 32.6% against 190,700 tons—35.1%—in 1959.

### Abnormal Price

Sir John Hay, chairman of the UNITED SUA BETONG business tells shareholders in his annual report that the present rubber price may not be held after the market has overcome its technical difficulties. But he thinks that it should then rest at a highly profitable level for the remainder of the year.

Sir John's view is that an indefinite continuance of the present abnormal price would not be desirable since it would encourage the use of synthetics and other substitutes. Already it has resulted in a serious falling off in demand for natural latex in the form in which the bulk of the company's output is processed.

As far as the group is concerned the directors do not expect in terms of output to repeat for 1960 the exceptional performance of 1959. In that year the rubber crop increased to a record of over 24m. lb. Sir John, however, reports that sales so far amounting to 7.40m.lb. show an increase of 3d. per lb. over the average of last year. There are contracts outstanding for the delivery of concentrated latex, the equivalent in terms of dry rubber of 4.45m. lb. at a premium over the price of sheet. But sales of rubber so processed have since fallen steeply.

After this year it is expected that outputs of rubber in all forms will follow an ascending scale and by 1965 are estimated to be at the rate of 30m. lb. per annum. Despite increasing wages and higher prices of materials, cost per lb. over the last five years have been maintained at a 'remarkably stable level.' Sir John says this would not have been accomplished except that the mounting expenditure was matched by increased output per unit.

Referring to the proposal which received only partial support from shareholders, submitted in 1956 for the investment, in association with others, of part of funds in equities through the medium of an investment trust with a capital of £1,500,000, Sir John said had the proposed investment followed that course, the appreciation to date would have been over £1,000,000.

### Commanding the Market

Since the shares of LONDON RUBBER were made available 10 years ago the company has made unbroken progress, and the results produced just recently were the best ever to date and by a good margin, too. The group claims to be the largest producer of dipped latex products in Europe. Despite this command of the market, the board has broadened its activities. How far these contributed to the current results is not at the moment ascertainable. Profits have gone up from £708,000 to £841,000 and the dividend from 20% to 30%.

Sir Eric MacFadyen is another leading figure in the rubber plantation world who looks to the future with confidence. In his report to shareholders of LONDON ASIATIC RUBBER he summed up his views on nearby prospects with the suggestion that the market has been saved from acute shortage of supplies only by substantial releases from stockpiles and that at the present juncture and possibly for some time ahead natural rubber will be in short supply.

In connexion with the possibility of the price eventually settling down on a lower basis Sir Eric pointed out that rubber selling at three shillings provides high dividends for all producers whether they be good or not so good, and even at two shillings there would be a good living for all although profit margins would naturally then differ between producers. Below this point he considers that there might be little incentive to create new facilities for the expansion of synthetic production.

The company has taken over through a subsidiary an estate of over 2,300 acres and has since secured the issued capital of ORIENTAL RUBBER and LANADRON RUBBER. Between them these two own 16,000 acres of rubber and 2,000 acres of oil palms. In this way London Asiatic has been built up to one of the biggest among the sterling companies operating in Malaya with group areas of 54,000 acres rubber and 3,300 acres oil palms, capitalized, by the way, on an outstandingly conservative basis of £28 per acre.

The issued capital allowing for shares still to be issued in connexion with the Lanadron deal, will stand at £1,628,934 against which the balance sheet indicates net liquid assets of £400,000 apart from trade investments which are almost certainly worth a good deal more than the balance sheet cost of £173,000.

Mr Thomas Barlow and his fellow directors of HIGHLANDS AND LOWLANDS PARA RUBBER can legitimately claim to have set the pace in the movements towards consolidation now gathering momentum in the industry. The company began the policy of grouping two years ago and in the meantime the planted areas under its supervision have expanded from under 14,000 acres to over 54,000 acres. The issued capital now stands at £2,169,000 —market value over £8 million—compared with £469,000.

Over the period the company acquired control of six companies forming the GIBSON AND ANDERSON (GLASGOW) group as well as VALLAMBROSA RUBBER and SCOTTISH MALAYAN estates. The accounts of Highlands disclose a comfortable financial position like so many of the other rubber concerns we have commented on recently. Net liquid assets figure at £1,298,000 or £24 per acre under cultivation which contrasts with a capital cost of £40 per acre. It has been pointed out that following the enlarged status of the company the average investment of stockholders is now much larger than formerly with an increasing number of investment trusts and insurance companies in the list. This latter point in itself is good enough reason to suggest to our readers that the shares are right to buy. Standing at 7s. 9d. the 2s. shares offer a return of £10 on every £100 invested. This yield from an acknowledged leader in this particular field seems to us indeed a generous one.

In our last issue dealing with plantation affairs we reported on the LONDON SUMATRA RUBBER offer for no less than seven other firms. A week ago it was announced that these had in actual fact been accepted by large majorities in each individual case.

Following on the increase of London Sumatra's authorized capital to £1,100,000 the directors declared all the offers unconditional subject to the granting of permission to deal in and quotation for the shares to be issued pursuant to the offers. It is hoped that allotment of the company's shares in respect of all valid acceptances received up to the close of business on June 14 will have taken place on June 23, and that dealings in the shares on the Stock Exchange will have commenced immediately thereafter.

The last date for receipt of acceptances has been extended in all cases to July 5.

# Rubber Markets

## LONDON

Demand for 'spot' parcels of No. 1 RSS to meet an Iron-Curtain country order found offers scarce. This and a fair enquiry for near afloat parcels, together with covering of July Terminal, kept prices of near positions at a high level until latterly, when they fell steeply on the withdrawal of buyers. Forward Terminal positions fluctuated very narrowly throughout.

Latest prices are as follows:
No. 1 RSS Spot: 39d. nominal.
Settlement House:
July 36¼d.-36½d.
August 35⅝d.-35⅞d.
September 35¼d.-35½d.
July/September 35⅞d.-36⅛d.
October/December 34¼d.-34⅜d.
January/March 33⅛d.-33⅜d.
April/June 32⅜d.-33d.
No. 1 RSS cif basis ports:
July 35⅝d.-36d.
August 35⅝d.-35⅞d.
Godown:
July 123 cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, June, July, August, September, 19s., cif European ports, Spot, seller, 20s. 6d. Bulk, not quoted. Creamed, seller, August 19s. 7d. nominal. Normal or 28%, seller, July 16s. 3d.

## SINGAPORE

After opening slightly lower, the market steadied during the morning of June 20 on sellers' reserve and some lower sheet inquiry. There was good demand for nearby shipment of No. 1 sheet. Quiet but steady conditions prevailed in the afternoon. No interest in lower sheets was reported. The market was very quiet in after-hours dealings. Prices were steady.

Malayan cents per lb. fob Malayan ports to open ports

| | June 20 | Previous Close |
|---|---|---|
| No. 1 RSS, July .. | 124½–124⅝ | 124 –124¼ |
| Aug... | 124 –124⅛ | 123½–123⅝ |
| No. 2 RSS, July .. | 122½–123¼ | 122 –112⅝ |
| No. 3 RSS, July .. | 119⅜–120¼ | 119 –119⅜ |
| No. 4 RSS, July .. | 118 –118⅜ | 116½–117⅛ |
| No. 5 RSS, July .. | 113 –114 | 112½–113¼ |
| No. 1 RSS, Spot .. | 124½–124⅝ | 123⅝–124¼ |
| No. 3 blanket, thick remilled crepe, July .. .. | 113¾–115⅝ | 113 –115 |
| No. 1 fine pale crepe, July .. | 130½–132½ | 129½–131½ |
| 2X thin brown crepe, July .. | 112½–113¼ | 111½–112½ |

Tone: Very quiet but steady.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 232.40d. per gallon.

## BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on June 20 was 39.00 (39.00) US cents per lb.

## CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on June 20 was 146¼ (145¾) Ceylon cents per lb.

## NEW YORK

The New York rubber market ruled as under on June 20:

DEALERS' PRICES

US cents per lb. ex-dock

| | June 20 | Previous |
|---|---|---|
| No. 1 RSS, July .. | 43½t | 44a |
| Aug. .. | 42½a | 42⅝a |
| No. 2 RSS, July .. | 43⅛n | 43⅜a |
| Aug. .. | 42⅛n | 42⅛a |
| No. 3 RSS, July .. | 43⅛n | 43⅛a |
| Aug. .. | 42n | 42⅛a |
| No. 1 RSS, Spot .. | 46n | 46⅛n |
| No. 3 amber blanket, crepe, Sept. .. | 39⅛n | 39⅛a |
| No. 1 latex, thin crepe, July .. | 44⅛n | 44⅛n |
| No. 1 latex, thick crepe, July .. | 44⅛n | 44⅛n |

FUTURES—REX CONTRACT

| | Close | Prev. Close |
|---|---|---|
| July .. | 44.82t | 45.40b–45.60a |
| Sept. .. | 41.45b–41.49a | 41.95t |
| Nov. .. | 40.25b–40.45a | 40.60b–40.70a |
| Jan. .. | 39.35b–39.50a | 39.50b–39.75a |
| March .. | 38.53b–38.68a | 38.70b–39.00a |
| May .. | 37.90b–38.10a | 38.40b–38.70a |
| July .. | 37.60b–37.90a | 38.10b–38.30a |

Sales: 63. Tone: Steady.

## AMSTERDAM

The Amsterdam rubber market ruled as under on June 20:

Guilders per kilo

| No. 1 RMA | June 20 | Previous |
|---|---|---|
| June .. .. | 3.62 | 3.62 |
| July .. .. | 3.60 | 3.60 |
| August .. .. | 3.59 | 3.59 |
| September .. | 3.58 | 3.48 |
| July/September .. | 3.59 | 3.59 |
| October .. .. | 3.42 | 3.42 |

Sales: 60. Tendency: Quiet.

Rubber futures were on both sides of the market on June 20. Earlier gains of about 25 points were registered reflecting the steadiness in London and Singapore. Later, however, the market reacted as scattered selling touched off stop loss orders. Prices were down more than 50 points in some cases. Dealers point out that the market is very thin. Recent advances pushed prices to new highs for the current move and are very vulnerable to selling. The July position at the end of last week was up a total of 325 points for the period. Physical rubber was quiet and a shade lower. In late dealings, futures recouped part of the day's losses. Physical rubber was a shade lower. Limited business was reported done for RSS No. 1 on a July and a September landed basis.

## DJAKARTA

Only very small quantities of sheet No. 1 were transacted on June 20 at 46.50 rupiahs per kilo in the morning session and at 45.50 rupiahs in the afternoon. There were hardly any buyers. The market closed very quiet.

Rupiahs per kilo

| | June 20 | Previous |
|---|---|---|
| Spot No. 1 Priok .. | 45.50b | 47.00b |
| Spot No. 2 Priok .. | 44.50b | 46.00b |
| Spot No. 3 Priok .. | 40.00n | 40.50b |
| No. 1 fine pale crepe, spot .. .. | 42.50b | 42.75b |

Tone: Very quiet.

# Rubber Crop Returns

*Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.*

RUBBER ESTATE AGENCY LTD.

*April*

Kuala Lumpur.—546 (549). 7 mths—4,479 (4,526).
Jeram.—245 (255). 7 mths—2,131 (1,985).
Tamiang (Malaya).—59 (59). 7 mths—488 (506).
Sungei Kahang.—150 (129). 7 mths—1,062 (957).
Bandar Sumatra.—72 (72). 9 mths—797 (903).
Batu Kawan.—38 (57). 8 mths—487 (481).
Buntar.—95 (100). 4 mths—415 (383).
Kepitigalla.—30 (31). 1 mth—30 (31).
Langkat Sumatra.—62 (60). 4 mths—295 (293).
Sungei Bahru.—104 (91). 10 mths—1,275 (1,042).
Tambira.—78 (82). 10 mths—1,113 (1,069).
Tanjong Malim.—275 (326). 10 mths—3,433 (3,494).
Sennah.—90 (101). 4 mths—563 (550).
Amalgamated Rubber.—38 (20). 4 mths—166 (136).
Java Rubber.—90 (82). 4 mths—372 (360).
Soember Ajoe.—20 (33). 7 mths—114 (204).

## Computers in the Rubber and Plastics Industries

The trend towards instrumentation is recognized by the National College of Rubber Technology, which is offering a two-day full-time course arranged in conjunction with an industrial organization of international repute (see advertisement p. 993). Dr F. H. Cotton, Head of the College, is enthusiastic about the support received by the College for its short courses: particularly the residential ones. There is a limited number of places available in Carleton Grange on this occasion.

## Anic SBR Agents

Hecht, Heyworth and Alcan Ltd., have announced that they have been granted the agency in the UK and the Republic of Ireland for ANIC synthetic rubbers. In reporting this in *RJIP* June 4 1960 page 845, the prices for ANIC 1708 under 'a' and ANIC 1712 under 'b' were given as 18.20d./lb. The price in both instances should be 18.00d./lb.

# *Industry* INTELLIGENCE

## Technical Data

### Sterling V GPF Black

Technical Information Bulletin No. 9 issued by Cabot Carbon Ltd., 62 Brompton Road, London, S.W.3, deals with the properties and uses of Sterling V GPF carbon black, which the company has recently started producing in this country. This black provides in a single grade the unusual combination of HMF modulus, SRF resilience and typical oil black smooth extrusion. Sterling V has found increasing use throughout the world in a wide variety of applications including tyres, wire and cables, footwear and extruded goods, and its properties are compared in the report with Sterling S SRF and Sterling SO FEF, in various loadings in cold SBR and natural rubber formulations.

### Epoxides for Cable Jointing

Epoxide resin systems are becoming well established as jointing materials for use in the laying of cables, as they have certain technical and economic advantages over the more conventional materials such as bitumen. Adhesion of epoxides to most surfaces is good, particularly metal conductors, armouring and most types of tape, and the need for cumbersome heating equipment is eliminated. Simple moulds made from thermoplastic sheet, pulp or similar materials are quite adequate and due to the control possible over the setting time the jointing cycle is quicker.

Although relatively expensive materials, this is to some extent offset by their superior technical properties, and the use of a range of low cost hardeners, introduced recently by Bakelite Ltd., together with pitch or similar extenders reduces the cost of the final jointing compound still further.

Full details of this development, including suggested formulations are included in Advance Information Sheet E.40 obtainable from Bakelite Ltd., 12-18 Grosvenor Gardens, S.W.1.

### Synpol 8000 Oil-Extended Polymers

Texas US Chemical Company, 260 Madison Avenue, N.Y. 16, Bulletin No. 11, describes Synpol 8201 which is a light-coloured, cold, oil-extended polymer containing 50 parts of naphthenic oil, designed particularly for maximum economy in compound design. It contains a non-staining, non-discolouring stabilizer, and has a low water-soluble ash content, making it suitable for electrical and other low moisture absorption applications. The bulletin gives specification and properties of the polymer, and also compounding details and properties of typical compounds for low and high cost mechanical goods, automotive weatherstrip, floor tiles, proofing, insulated wire and cable compounds, hard rubber and shoe soles, all of which are possible outlets for the material.

Bulletin No. 12 is concerned with Synpol 8202 which is an oil-extended SBR polymer with 50 parts of highly aromatic oil. It is intended as a general purpose material for products where colour and staining are not of paramount importance, and either by itself or blended with other Synpol polymers produces stocks with good processing characteristics and physical properties. Possible uses for the polymer include tyres, camelback and moulded and extruded mechanical goods.

### Technovit

Rubert and Co. Ltd., Demmings Road, Cheadle, Cheshire, are sole British agents for a new German material which is a cold curing resin, claimed to set without shrinkage or expansion. The applications for this are varied, and include the measurement of surface finish by the replica method, electron microscopy, electrical insulation, cementing acrylics and the restoration of antique pottery and china.

Technovit is available in five grades according to the application, either transparent or opaque and in any colour.

## Machines, Materials and Equipment

### Drop Mat for Drums

When drums are unloaded by rolling from a lorry, some sort of 'drop mat' is needed to cushion their fall. Too hard a mat is ineffective, and too resilient a mat, such as the old rubber tyre sometimes used, may cause the drum to bounce off out of control.

Experiments carried out by the Dyestuffs Division of I.C.I. have resulted in the development of an effective mat which will cushion the fall of a drum, and allow it to roll off in a controllable way as the mat recovers from impact. The design is based on polyurethane foam covered with coir netting.

### Hydraulically Operated Nut

A hydraulic clamping nut allows very high forces to be exerted without the corresponding torque strains that are caused by tightening with a spanner.

The nut is slightly larger than a standard article and is made in a variety of sizes to cover all threads with diameters from $\frac{1}{2}$in. to 2in. It is screwed on by hand until tight and then the pressure screw is tightened with an Allen key. Tests have shown that with a 1in. nut pressures of 4 tons per sq. in. can be obtained, whereas the greatest obtained by tightening with a spanner 16in. long and a hammer was 2 tons per sq. in. Removal of the nut was as effortless.

One application of the nut is on the arbor of a milling machine, where the elimination of strains imposed by spanner tightening removes risks of damaging the arbor and bearings.

## New Publications

### Acrylic Stoving Finishes for Domestic Appliances

Vinalak R2913 is a solution of a new acrylic copolymer which cross-links with epoxy resins. One-coat stoving finishes for domestic appliances can be made by pigmenting R2913 in a ball mill followed by the addition of a cross-linking agent and a catalyst. A typical formulation for a finish of this kind is given in a leaflet issued by Vinyl Products Ltd., Butter Hill, Carshalton, Surrey.

Finishes based on R2913 have excellent resistance to staining without the need for very high stoving temperatures; most domestic stains can be removed, even days after application, by wiping with a cloth damped with a synthetic detergent solution. The finishes are highly resistant to hot detergent solutions thus making them particularly suitable for application to washing machines. The leaflet contains a comparison between a one-coat stoving finish based on R2913 and a conventional two-coat stoving system. The one-coat R2913 finish compared favourably with the two-coat system and was distinctly superior to the two-coat system in gloss, hardness and resistance to hot detergent.

### Polyurethane Developments

A booklet entitled 'Recent Developments in Polyurethanes' has recently been published by the Oil and Colour Chemists Association, Wax Chandlers Hall, Gresham Street, London, E.C.2. This was written by Dr H. A. Hampton, Mr R. Hurd and Mr H. J. Shearing, all of I.C.I. Ltd., Dyestuffs Division, and follows a paper previously published on the subject by the authors.

Recent advances in the chemistry of polyurethanes and the formation of polyethers are discussed. The results of recent tests on the toxic effects and hazards of isocyanates are given, and the development of spray equipment for the application of urethane lacquers and foams is described. The effect of the composition of urethane films on colour and gloss retention, electrical properties, water vapour transmission and low temperature flexibility is examined, and a brief description is given of the method used to determine this last property.

# Material Prices

Prices of materials appear regularly in RUBBER JOURNAL AND INTERNATIONAL PLASTICS on the last Saturday of each month. It will be appreciated if suppliers will give notification of any price changes and additions to or deletions from their range. Comments on the present materials and classifications are invited in order that the list may be made of maximum service to our readers.

*pl—per lb pc—per cwt pg—per gallon pt—per ton ag—according to grade aq—according to quantity xs—ex-store xw—ex-wharf dp—duty paid sp—special prices for contracts del—delivered cp—carriage paid*

### Accelerators

Alpha plaq 5s. 8d.—6s. 4d.
Ancap plcp 3s. 8d.
Ancap Zinc salt plcp 2s. 10½d.
Ancatax plcp 4s.
Ancazate ME plcp 6s. 10d.
Ancazate Q pldel 6s. 4d.
Ancazate ZZ pldel 5s. 3d.
Ancazide ME plcp 6s. 2d.
Cu.D.D. plaq 9s. 3d.—10s.
D.Bu.D. plaq 10s. 6d.—11s. 3d.
D.D.D. plaq 12s. 2d.—13s. 3d.
D.P.G. plcp 3s. 8d.
D.O.T.G. plcp 3s. 8d.
Dibenzo GMF plaq 27s.—28s. 6d.
Furbac plcp 5s. 3d.
Gamma plaq 10s. 6d.—11s. 3d.
GMF plaq 27s.—28s. 6d.
L.M.D. plaq 9s. 3d.—10s.
M.Z.1 plaq 3s. 6d.—4s. 2d.
N.Bu.D. plaq 10s. 6d.—11s. 3d.
Ni.P.D. plaq 12s. 2d.—13s. 3d.
P.P.D. plaq 12s. 2d.—13s. 3d.
P.T.D. plaq 12s. 2d.—13s. 3d.
Robac 22 plaq 10s.—11s. 3d.
Robac 44 plaq 9s. 1d.—9s. 10d.
S.P.D. plaq 9s. 3d.—10s.
Suparac M pl 9s. 7d.
T.B.U.T. plaq 15s.—16s.
T.E.T. plaq 6s. 6d.—7s. 4d.
Thiuram P.25 plaq 15s.—16s.
T.M.S. plaq 7s. 8d.—8s. 6d.
T.M.T. plaq 5s. 4d.—6s. 3d.
Vulcacit CZ pldeldp 7s. 1d.
Vulcacit F pldeldp 4s. 8½d.
Vulcacit NP pldeldp 11s. 2d.
Vulcacit P Extra N pldeldp 8s. 1d.
Z.B.E.D. plaq 15s. —16s.
Z.Bu.D. plaq 6s. 3d.—7s. 3d.
Z.D.C. plaq 5s. 1d.—5s. 7d.
Z.L. plaq 9s. 3d.—10s.
Z.P.D. plaq 9s. 3d.—10s.

### Antioxidants and Antiozonants

Agerite HPX plcp 4s. 8d.
Antioxidant 2246 pldel 12s. 4d.
Antioxidant SP pldel 4s. 6d.
BLE-25 plaq 3s. 7d.—4s. 5d.
BXA plaq 3s. 6½d.—4s. 5½d.
Naugawhite plaq 4s. 9d.—5s. 6d.
Octamine plaq 3s. 9d.—4s. 6d.
Polygard plaq 3s. 7½d.—4s. 5d.
UOP 88 plxs 9s. 3d.
UOP 288 plxs 9s. 3d.
Wing-Stay S. plaq 3s. 8d.—4s.
Wing-Stay T. plaq 4s. 10d.—5s. 6d.
Wing-Stay 100 plaq 10s. 6d.—11s. 6d.

### Compounding Ingredients

Barytes ptaqag £10—£40
Calcium Silicate plaqdel 9d.—10½d.
Calcene ptxwaq £52—£69 10s.
Carbonate, Light Mg. ptsp £97
Carbonate, Actidated Ca. ptaq £28—£30
Carbon Blacks:
Conductex SCF pl 1s. 2½d.
Dixie 45 GPF plaqxs 6¾d.—7¾d.
D.xie 60 HAF plaq 8d.—9d.
Furnex SRF pl 9d.
Kosmos 45 GPF plaq 6¾d.—7½d.
Kosmos 60 HAF plaq 8d.—8½d.
Magecol 888 SRF pl 7.33d.
Micronex MPC pl 11½d.
Micronex W6 EPC pl 11½d.
Philblack G. GPF plaqxs 6¾d.—7¾d.
Regal 300 plaq 8d.—8½d.
Regal 600 plaq 10d.—10½d.
Statex B. FF pl 10½d.
Statex R. HAF pl 11d.
Statex 93 HMF pl 9½d.
Sterling SO FEF plaq 7¾d.—7¾d.
Sterling V. GPF plaq 7½d.—7¾d.
Ukarb 327 GPF plaqxs 6¾d.—7¾d.
Vulcan 6 ISAF plaq 10d.—10½d.
Vulcan C CF plaq 11d.—11½d.
Vulcan 3 HAF plaq 8d.—8½d.
Vulcan XXX SCF plaq 1s.2½d.—1s.2¾d.
China Clay ptagxs £12—£68 10s.
Factice Dark pl 1s. 0½d.
Factice Light pl 1s. 7d.
Kieselguhr Spanish White ptxs £37 12s. 6d.
Lithopone 30% plxs £68 10s.
Manosil VN3 ptaq £120 5s.—£150 5s.
Micafine Powdered Mica ptxs £67 10s.
Ochre Yellow pcxs £1 19s.
Oxide Light Mg ptsp £245
Oxide Red pcxs £4 3s.
Oxide Titanium 98% pcxs £8 8s.
Rutiox CR pcxs £9 3s.
Rubber Gen. Gran. Mineral. ptxs £35 5s.
Silica Hydrated ptxs £113
Sulphur Manox Insoluble pldel 1s. 9d.
Sulphur Powdered ptdel £20 17s.
Sulphur Sublimed Flowers ptxs £52 10s.
Talc Italian ptxs £28 2s. 6d.
Tufknit Durham CS plaq 8½d.—10½d.
White Lead Dry ptdel £199 5s.
Whitetex 2 Clay ptxs £40 10s.
Whiting ptxsaq £5 9s. 6d.—£7 7s. 6d.
Zinc Oxide pcdel £6

### Plasticizers and Softeners

Abalyn pcaq 220s.—271s.
Al Stearate ptxwdp £253 10s.
Bisoflex 102 ptaq £513—£568
Butyl Ricinoleate plaq 2s. 6d.—2s. 6¾d.
But. Ac Ricinoleate plaq 3s. 0½d.—3s. 1½d.
Butyl Stearate ptaq £277—£282
Ca. Stearate ptcp £220
Diallyl Phthalate plaq 3s. 11d.—4s. 11½d.
Dialkyl Phthalate ptaq £221—£222
Dibutyl Phthalate ptaq £203—£204
Dibutyl Sebacate pl 5s. 9½d.
DiOA ptaq £354—£357
DiOS plaqsp 5s. 0½d.—5s. 2d.
DOA ptaq £414—£420
DOP ptaq £276—£277
DOS plaqsp 5s. 7½d.—5s. 9d.
Disobutyl Phthalate ptaq £196—£197
Diisosoctyl Phthlatate ptaq £221—£222
Dinonyl Phthalate ptaq £211—£212
DNS plaqsp 5s. 2¾d.—5s. 4½d.
Ester Gum pcag 130s.—150s.
Flexol 3GO pl 4s. 8d.
Hercolyn pcaq 242s.—249s.
Lankroflex ED3 plaq 3s. 2d.—3s. 2½d.
Lankroflex 29 ptaq £216—£217
Lead Stearate ptxwdp £223 10s.
Methyl Ricinoleate plaq 2s. 4d.—2s. 4¾d.
Me. Ac. Ricinoleate plaq 2s. 11½d.—3s.0½d.
Polyglycol Oleate 400 pt £285
Reomol D79A ptaq £354—£357
Reomol D79S plaqsp 5s. 0½d.—5s. 2d.
Reoplex 100 plaqsp 6s. 1½d.—6s. 2¾d.
Reoplex 110 plaqsp 5s. 10d.—6s. 5½d.
Reoplex 220 plaqsp 5s. 6½d.—5s. 8d.
Reoplex 300 plaqsp 7s. 2d.—7s. 3½d.
Reoplex 400 plaqsp 4s. 2½d.—4s. 4d.
Rosin Oil pgag 8s.—18s.
Triphenyl Phosphate pt £379
Tricresyl Phosphate pt £233
Trixylyl Phosphate pt £200
Zinc Stearate ptaqdel £220—£230

### Solvents and General Chemicals

Acetic Acid ptdelaq £97—£106
Acetic Anhydride ptdel £128
Acetone ptdelaq £75—£120
Alcohol:
Absolute 74.5op pgdelaq 4s.0½d.—4s.4¾d
Butyl ptaq £132—£193 10s.
sec-Butyl ptdelaq £128—£168
Ter-Butyl ptdelaq £172—£195
Isopropyl Tech.99% pgdelaq5s.—6s.5½d.
Butyl 'Carbitol' pt £283
Butyl Acetate ptaq £159—£217
Caprylic Acid ptdel £395
Carbon Bisulphide ptxs £71 10s.
Carbon Tetrachloride pgaq 12s. 4d.—20s.
'Cellosolve' Acetate pt £250
Cresol m- 98% pldel 4s. 9d.
Cresol o- 30/31°C. pldel 1s.
Cresol p- 34/35°C. pldel 5s.
Ethyl Acetate ptaq £131—£189
Formaldehyde ptdel £40
Glycol:
Diethylene pt £158
Ethylene pt £132
Polyethylene 200 pt £214
" 300 pt £214
" 400 pt £214
" 1,500 pt £264
" 4,000 pt £274
" 6,000 pt £294
Isopropyl Acetate ptaq £126—£184
Isobutyl Acetate 80% ptaq £126—£185
Lauric Acid ptdel £273
M.E.K. ptdelaq £134 10s.—£143 10s.
M.I.B.K. ptdelaq £166—£209
Methylated Spirits pgdelaq:
Industrial 61op 5s. 5½d.—7s. 2d.
" 74 op 6s. 3d.—7s. 11½d.
'Q' Grade 68 op 8s. 5½d.—10s. 5d.
Pyridinised 66 op 5s. 10d.—7s. 6½d.
Denatured Methanol 3s. 9½d.—4s. 10d.
Monoethanolamine pt £252
Naphtha Coal tar pg:
Heavy 90—190 4s.
Light 90—160 5s. 1d.
Palmitic Acid ptdel £147
Phenol pldelaq 1s. 4d.—1s. 7d.
Pyridine pg 16s. 6d.
Stearine ptag £108—£130
Toluol Pure/Nitration pg 5s. 8d.
Toluol 90's pg 5s.
Triethanolamine pt £224
Xylol 2/30 pg 5s. 9d.

## Belgrave Move

Belgrave Industries, the scrap rubber and plastics merchants, are expanding their business. The firm is moving to bigger premises at Cheshire Works, Cheapside, Hyde, Cheshire.

## Some Chickens

Millions of bags made from Bexthene polythene are being produced by Mark Anthony and Son Ltd. of Watford for the Mac Chicken. This is an 'oven ready' bird which is being marketed by Mac Fisheries. Bexthene is BX Plastics's polythene.

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Mr R. A. Moir, director of Standard Telephones and Cables, has been elected chairman of the Telecommunication Engineering and Manufacturing Association, and Mr W. F. Oakley, director of Automatic Telephone and Electric Company, has been elected vice-chairman.

## TRADE MARKS

*Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.*

FABLONEX (798,233) Articles included in Class 20 made from sheet synthetic resin plastics. Commercial Plastics Ltd., Willington Quay, Wallsend - on - Tyne, Northumberland. (Class 20; March 29 1960).

SOCA BUTYL

(783,160) Chemical products consisting of or containing isobutylene derivatives, for use in industry. Also 783,161 Plastics included in Class 17 in the form of sheets, rods, tubes, strips, bars, blocks and shaped sections; synthetic rubber; all consisting of or containing isobutylene derivatives. Société du Caoutchouc Butyl (Socabu), 8 rue Bellini, Paris. Address for service is c/o Lloyd Wise, Bouly and Haig, 10 New Court, Lincoln's Inn, London, W.C.2. (Classes 1 and 17; March 22 1960).

SOCABUTENE (792,978) Plastics included in Class 1 consisting of or containing isobutylene derivatives. Also 729,380 for products included in Class 17. Société du Caoutchouc Butyl (Socabu), 8 rue Bellini, Paris. Address for service is c/o Lloyd Wise, Bouly and Haig, 10 New Court, Lincoln's Inn, London, W.C.2. (Classes 1 and 17; March 22 1960).

SOCABUTEX (792,979) Plastics included in Class 1. Société du Caoutchouc Butyl (Socabu), 8 rue Bellini, Paris. Address for service is c/o Lloyd Wise, Bouly and Haig, 10 New Court, Lincoln's Inn, London, W.C.2. (Class 1; March 22 1960).

ZEVA (796,268) Electrically operated machines and electrically operated tools, all for sealing, welding and cutting polythene and cellophane film, soft P.V.C. foils of polyvinylchloride plastics, aluminium foils and wax paper. S. Kempner Ltd., 29 Paddington Street, London, W.1. (Class 7; March 22 1960).

NEOTHANE (791,250) Tyres for vehicle wheels and inner tubes therefor. The Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio. Address for service is c/o Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W.C.2. (Class 12; March 22 1960).

SPANDOFOAM (795,449) Foamed plastics included in Class 17 in the form of sheets, slabs, rods, tubes, foils and shaped sections; articles included in Class 17 made from the aforesaid goods; and foamed insulating materials. The Baxenden Chemical Co. Ltd., Clifton House, 83-117 Euston Road, London, N.W.1. (Class 17; March 22 1960).

LI-LEX (787,926, 787,927 and 787,932) All goods included in Class 20 made of plastics. Also Classes 21 and 34. P. R. Cow (Slough) Ltd., 470 Streatham High Road, London, S.W.16. (Classes 20, 21 and 34; March 22 1960).

BOOTS SNUG (797,487) Rubber hot water bottles. Boots Pure Drug Co. Ltd., 37 Station Street, Nottingham. (Class 21; March 22 1960).

BOSTIKOL (799,039) Sealing compositions included in Class 17, based on natural or synthetic rubber. B.B. Chemical Co. Ltd., Ulverscroft Works, Ulverscroft Road, Leicester. (Class 17; April 12 1960).

## Increases of Capital

Highlands and Lowlands Para Rubber Company Ltd. (89,042), 10-15 Mincing Lane, E.C.3. Increased by £900,000 in 2s. ordinary shares, beyond the registered capital of £2,100,000.

A. & G. Plastics Ltd. (625,833), Mumby's Yard, Gosport, Hants. Increased by £1,000 in £1 shares, beyond the registered capital of £100.

## NEW COMPANIES

**Flexible Foams Ltd.** (658,560).—May 9. Capital: £1,500 in £1 shares. To carry on the business of manufacturers of and dealers in foam rubber and rubber products of all kinds, plastics, etc. The directors are: Collis N. Jones, 233 Rose Lane, Mossley Hill, Liverpool, 18; Norman L. Robinson, 'Sunnyside,' Tithebarn Lane, Melling, near Liverpool.

**K.M.T. Plastics Ltd.** (658,221).—May 4. Capital: £500 in £1 shares. The directors are: Joe Kay, 546 Molton Road, Darwen; Arthur R. Millington, Newleigh, Ashleigh Street, Darwen; Cecil Turner, 2 Winston Place, Lower Darwen. Regd. office: 544 Bolton Road, Darwen, Lancs.

**D. Chuwen and Co. Ltd.** (659,505).—May 17. Capital: £2,000 in £1 shares. To carry on the business of manufacturers, makers, and merchants of and dealers in waterproof rainproof and weatherproof garments and wearing apparel of all kinds, etc. Mrs Dora Chuwen, 15 Hartley Avenue, Prestwich, Manchester, is the first director. Regd. office: 103/5 Bury New Road, Manchester, 8.

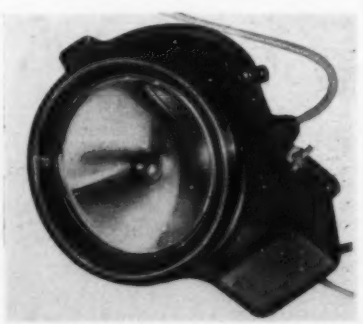
**Crel Ltd.** (659,138).—May 13. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in rubber bonded abrasive, buffing and polishing wheels, etc. The directors are: Bernard Ross and Mrs Elsie Ross, both of 3 Queen's Drive, Liverpool, 18. Regd. office: 29/33, Everton Brow, Liverpool, 3.

**Talboy Designs Ltd.** (659,101).—May 13. Capital: £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastic, modelling and moulding materials, etc. The directors are: James Talbot and Elsie F. Talbot, both of Moat Cottage, Moat Lane, Wingrave, near Syleabury, Bucks. Regd. office: 170 Long Lane, N.3.

**E.G.B. Ltd.** (659,511).—May 17. Capital: £1,000 in £1 shares. Objects: To carry on the business of merchants, agents, importers and exporters, and manufacturers of and dealers in merchandise made from leather, rubber, textiles, plastics, natural and synthetic materials, footwear and footwear accessories, etc. Ernest G. Bayreuther is the first director. Regd. office: Sweden House, 13 Stratford Place, W.1.

**D. J. E. Pell Ltd.** (659,508).—May 17. Capital: £500 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in travel, leather and fancy goods, toys, novelties, plastic goods, etc. David J. Pell is the first director. Regd.

**N.R.T. Mouldings Ltd.** (660,046).—May 20. Capital: £2,000 in £1 shares. To carry on the business of manufacturers, workers, welders and fabricators of and dealers in plastic materials and synthetic products of all kinds, moulding and moulding materials, etc. The directors are: John M. Roy, 30 Moor Grange View, Leeds, 16; John S. Braime, 47, Rockwood Crescent, Woodhall Park, Pudsey; Thomas E. Niven; and Conrad L. Turner. Regd. office: 1, Oldfield Lane, Leeds, 12.



**Mity-Lite, a new battery-powered portable light, is protected by a case in Cycolac ABS resin made by Marbon Chemical Division of Borg-Warner Corporation, USA, whose UK agents are Anchor Chemical The light floats, operates under water and may be suspended from the user's neck so that both hands remain free**

## PATENT LIST

*Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.*

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on June 29 1960

Imperial Chemical Industries Ltd. Continuous manufacture of polymeric materials from polyesters and organic diisocyanates. 839,183.

Cocker Chemical Co. Ltd., G. Watson, and G. W. Gladden. Chlorinated phenols. 839,972.

R. N. Haszeldine and H. Iserson. Preparation of 1, 2, 3, 4, tetrahydroperfluorobutane and perfluorobutadiene. 839,756.

British Rubber Producers' Research Association (J. S. Low and D. H. Taysum). Preservation of latex. 839,758.

H. N. Ansell and L. Landau. Articles made from rubber or rubber-like materials. 839,759.

Compoflex Co. Ltd. Flexible tubing. 839,760.

Imperial Chemical Industries Ltd., E. Gee and E. A. Packer. Manufacture of cellular polymeric materials. 839,184.

Technical Waxes Ltd. Means transporting of thermoplastic materials in bulk. 839,548.

Imperial Chemical Industries Ltd. Manufacture of cellular polymeric materials. 839,185.

Imperial Chemical Industries Ltd., E. Gee, H. Gudgeon, and K. Stephenson. Manufacture of polymeric materials. 839,186.

Imperial Chemical Industries Ltd. Manufacture of cellular polymeric materials. 839,187.

Imperial Chemical Industries Ltd. Manufacture of cellular polymeric materials. 839,188.

Courtaulds Ltd. Cellulosic threads. £839,451.

Dunlop Rubber Co. Ltd. Vulcanization of gelled rubber latex. 839,382.

Dunlop Rubber Co. Ltd. Barrel type extruders. 839,766.

Farbwerke Hoechst Aktiengesellichaft Vorm, Meister, Lucius and Brüning. Process for the manufacture of thin shaped structures, such as filaments or foils, from linear polyesters. 839,845.

## Changes of Name

**Litfrills Ltd.** (643,854). Gown and mantle dealers, etc., Silkimac Works, Tortworth Street, Strangeways, Manchester, 3.—Name changed to London Waterproof Co. (Silkimac) Ltd.

**Aldridge Plastics Ltd.** (530,603). Redhouse Industrial Estate, Aldridge, Staffs.—Name changed to AEI Plastics (Aldridge) Ltd.

**London Waterproof Co. (Silkimac) Ltd.** (440,025). Silkimac Works, Tortworth Street, Manchester, 3.—Name changed to D. & A.S. (Holdings) Ltd.

## Latest Wills

Mr Herbert John Stone, of 70 Eaton Square, Westminster, S.W., a director and general manager of British Insulated Callender's Cables Ltd., who died on February 24 last, aged 64, left £28,081 gross, £27,798 net value. (Duty paid £4,981.)

Mr Oliver Gilbert Edwards, of Glencorse, Kenelm Road, Rhos-on-Sea, North Wales, formerly of Radcliffe Park Road, Salford, late a director of J. Mandleberg and Co. Ltd., rainproof clothing manufacturers, Pendleton, Salford, and of Craven, Dunnill and Co. Ltd., wall and floor tilers, Bridgnorth, Salop, who died on January 22 last, left £37,539 gross, £37,367 net value. (Duty paid £9,026.)

Mr John Cooper, of Summer Court, West Hill, Ottery St. Mary, Devon, late general manager of the Tenom Rubber Estates, who died on January 25 last, left estate in Great Britain valued at £59,045 gross, £58,866 net value. (Duty paid £19,078.)

# R·J·I·P CLASSIFIED ADVERTISEMENTS

## AGENCIES and REPRESENTATIVES

6d. a word, Minimum 12/6 Box 2/-

NEW market opportunity. Manufacturers or wholesale distributors of rubber, plastics and allied products desirous of exploring market possibilities in the West Indies and Jamaica in particular are invited to contact a progressive and responsible firm of manufacturers' agents interested in new lines.—Reply to E. M. Gayle, M.A., B.Ss., P.O. Box 66, Kingston, 4, Jamaica, West Indies. (256)

## MISCELLANEOUS

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PVC extrusions for the trade.—Esco (Rubber) Ltd., 34/36 Somerford Grove, London, N.16. (80)

SCISSORS, up to 7in., ground and set by London cutlers established over 100 years; 48 hours postal service, 1/6 per pair.—J. A. Fowler, 18/22 Bell Street, Edgware Road, London, N.W.1. PAD 1491. (74R)

## APPOINTMENTS VACANT

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AN adhesives technologist is invited to play an important part in the extension, throughout the world, of our technical service. The company manufactures synthetic thermoplastic resins and is situated in the London area. There is a pension and life assurance scheme in operation.—Applications may be addressed to Box 343. (343)

DESIGN draughtsman required by engineers manufacturing paper converting machines and hydraulic rubber and plastic presses. Applicants should have sound mechanical experience and/or hydraulic knowledge. Pension scheme in operation.—T. H. Dixon and Co. Ltd., Letchworth, Herts. (324)

TECHNICAL service representative required for well-known and widely used range of raw materials used in PVC, natural and synthetic rubber. Candidate must be fully qualified and well connected in these industries, and capable of taking charge eventually of an area. The position offered is exceptionally interesting from both technical and financial points of view.—Write in confidence, stating age, qualifications and experience, to Managing Director, Croxton and Garry Ltd., 16-18 High Street, Kingston-on-Thames. (354)

### RUBBER TECHNOLOGIST

Well-established company based on Manchester and supplying materials to the rubber manufacturing industry invites applications from technologists with qualifications which would enable them to take charge of the sales service section of their laboratories.

**A.I.R.I. standard or chemical qualifications supported by suitable experience in the rubber industry.**

Applications, which will be treated in strict confidence, should give details of age, education, technical standard and experience.—Box 340. (340)

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(356)

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